

# THE IRON AGE

Established 1855

New York, March 20, 1913

Vol. 91: No. 12

## Methods Employed in Leaf Spring Manufacture

Improvements in Processes and Accuracy in  
Mechanical Working and Heat Treatment  
Supplanting Old Crude Hand Methods

—BY E. F. LAKE—

Up to the present time leaf springs have been manufactured almost entirely by hand in a very crude way. There is now, however, a decided tendency toward improving the methods and using more accuracy in their mechanical working in heat treatment, largely due to the fact that automobile engineers are continually demanding a better and better product. The motor car probably imposes more severe strains on its leaf springs than any other vehicle, owing to the speed at which it travels over rough roads, and the motor truck which is steadily growing in size and numbers also requires reliable springs.

The Harvey Spring Company, Racine, Wis., was one of the first to install new and modern apparatus to supply this demand, and the halftone engravings are reproduced from photographs taken at its plant. Every month many tons of spring plates are cut to size and made into springs and the first item of importance is to handle these mill lengths with the least amount of labor. The method employed at the Harvey plant is illustrated in Fig. 1. Along the side of the building doors are arranged that are hinged at the top and lift up and the freight car which is to be unloaded is moved opposite the door opening into the bin. A sheet metal chute, A, is placed with one end on the car and the other inside the open door, and the steel is slid through this chute. The shearing machine which cuts the stock to the correct length is located at the end of the steel storage room and to convey the long plates to it two racks, shown at B and C, are used. While the steel in the rack B is being cut to the proper size, the other rack is being loaded, and when filled it is brought to the shearing machine on the overhead tracks, chain blocks serving to raise and lower the racks so that they can be easily placed in position for loading or unloading rapidly.

After the steel is cut to the proper length, the main or bottom plate of the spring is taken to the eye forming machine, Fig. 2, and the other plates are tapered on each end by rolls similar to those shown in Fig. 3. The furnaces for heating these plates are shown in both engravings at the right of the machines. At this point much damage can be done to springs by careless workmanship and the furnaces must be carefully watched to prevent overheating of the steel and the mechanical working must be properly done. To prevent the plate from being heated too far back stops are placed in the furnaces that will only allow the plates to be pushed into the furnaces far enough to heat them the correct distance from the end. As simple as this seems it is really surprising how few spring makers do it or realize its importance with regard to the life of the spring.

The temperature of the steel often reaches 1100 deg. C. before the taper is rolled, the metal rolling more readily at the higher temperatures. This will make the grain coarse and crystalline. The rolls compress the metal and this crystalline structure is broken up and replaced by

a new one which is much finer. If the temperature of the steel falls to the upper transformation point just as the rolling is finished, the metal will retain this fine grain. Each degree of temperature above the transformation point causes the steel to assume an added coarseness of grain until the crystalline structure is reached that is prevalent in cast steel. If the spring plates leave the rolls before cooling sufficiently, the fine grain produced by the rolls will coarsen in exact proportion to the temperature of the metal above the transformation point, such a coarsening of the grain also weakening the steel in proportion to the coarseness. On the other hand, if the rolling is continued



Fig. 1—The Steel Stock Piles, Carriers and Shearing Machine for Cutting the Stock to the Proper Length

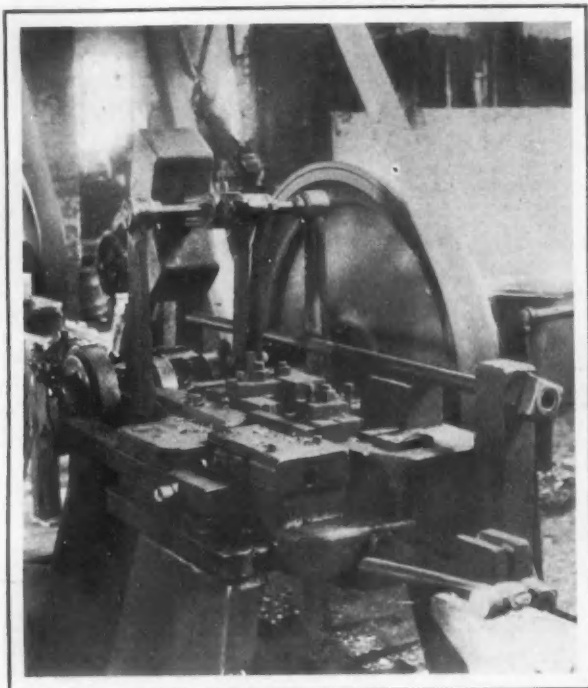


Fig. 2—The Machine for Forming the Eye in the Spring

after the temperature has fallen too far below the transformation point, internal stresses which can only be removed by a thorough annealing will be set up in the steel. These strains are apt to cause a sudden rupture of the spring when put into service. If the grain has only been slightly coarsened it can be brought back to its former fineness by correct heat treatment, but if it approaches the crystalline state it can only be refined by mechanical working such as rolling or forging. Therefore, in heating spring plates for rolling or eye turning care must be used to prevent them from being heated to a high temperature too far back from the ends. If the plates are only heated to *d*, as shown in Fig. 6, the rolls will compress and refine the grain. If, on the contrary, they are heated back to *e* there will be a zone of coarse crystalline grain between these two points which will be the

weakest part of the plate. In practice many springs break in this zone for that very reason, and breakages also occur from the same cause on the main plate between *f* and *g*.

The most important part of spring making is the heat treatment the plates are given. Apparatus that will enable the hardening and drawing temperatures to be controlled accurately are necessary to secure good results and the furnaces are the largest and first item to consider in this problem, the oven type being the one that has always been universally used for spring making. As any variation of a few degrees in the hardening temperature of the steel makes a considerable difference in the elastic limit and resistance to alternating stresses, it is necessary to have furnaces with a uniform temperature in all parts of the heating chamber or oven and the furnaces must be so designed that this temperature can be easily controlled and kept constant at a predetermined figure throughout a day's run. As the heating chamber in furnaces of this character is usually 3 ft. wide and 6 ft. long, it is not always easy to solve this problem. To secure the desired results, a battery of over-fired accurate temperature three-chambered oven furnaces, which were designed especially for this class of work by the Rockwell Furnace Company, New York City, has been installed and has given excellent results. This three-chambered furnace was designed for the purpose of having three separate fires in which to heat spring plates for the operations of pinching, hardening and tempering, each of which requires a different temperature. Usually a spring fitter and helper work at a single-chambered furnace. The spring plates are inserted in this and each is heated sufficiently to be pinched to the leaf immediately below it and made to fit the contour of its curve for the entire length. The plate is then put back

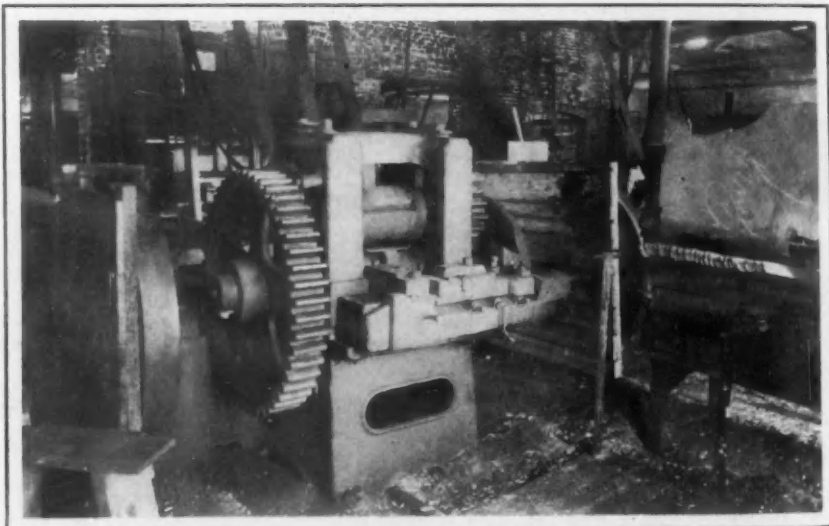


Fig. 3—Tapering Rolls and Furnace for Heating the Plates

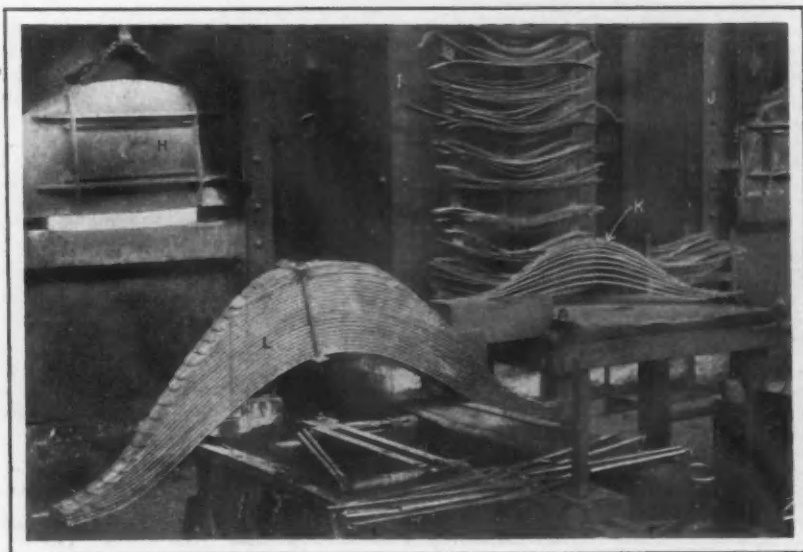


Fig. 4—The Accurate Temperature Furnaces, Spring Fitter's Bench and Spring Patterns

into the furnace and heated to the hardening temperature and then quenched in a tank of oil, after which it is again put into the furnace and allowed to remain until the oil burns off for the tempering operation.

In the background of Fig. 4 can be seen three of these furnaces, while others are located in the rear of the spring shaping machines in Fig. 7. The front of the furnace H, Fig. 4, which is used by the spring fitter and helper that work at the bench and the trough in the foreground is shown. The back of the furnace I which is worked from the gangway at its other end, as is the case in each alternate furnace of the battery, is shown together with the front of the furnace J. The shell of these furnaces is built of angle irons and sheet metal with a heavy cast-iron front and door. The door is counter-balanced so that it can be raised and lowered easily and the sides are braced

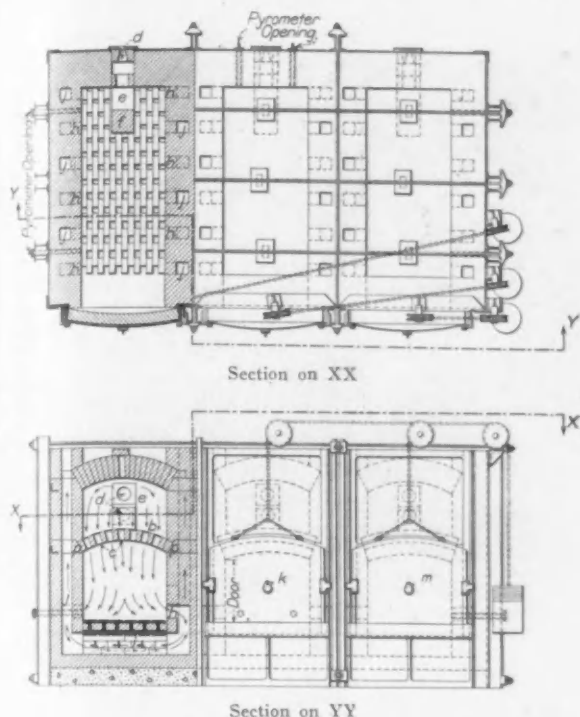


Fig. 5—A Three-Chambered Over-Fired Accurate Temperature Furnace

with T irons. The shell is set on a brick foundation and lined with 1-in. asbestos sheets. The furnace proper is built of firebrick inside of this shell.

The interior construction of the furnace, which is a three-chambered unit, can be seen by referring to Fig. 5. The heating chamber *a*, which can also be seen through the door opening of the furnace *H*, Fig. 4, is covered with a perforated firebrick arch, *b*, Fig. 5, constructed of special, keyed, refractory tile. A blast of fuel oil and steam is sent through the burner opening *d* into the combustion chamber *e* where the mixture of burning atomized oil and steam strikes the baffle wall *f* and is distributed evenly throughout the chamber for a more thorough combustion to take place. The heat from the flames then travels downward through the numerous perforations *c* in arch *b* into the heating chamber or oven *a* and completely floods it. The spent gases pass through openings *h* under the floor of the oven at *i* and out through flues *j* in the side walls, the travel of the flames being indicated by the arrows. The arch is securely joined to the furnace by longitudinal angle irons *p*, which are firmly imbedded in the side walls. These take the thrust of the arch which is built of wedge tiles of special shape. The outside of the angles rests against the steel plates of the shell, which are prevented from buckling by vertical I-beam stays that are riveted to the plates. When the arch is properly built it is impossible for it to fall down until the bricks have burnt through, by which time the side walls and hearth would be so badly burnt that relining of the furnace would be necessary. It will be seen that the heating chamber is entirely surrounded by flames from the burning fuel and is also filled with the hottest part of the flame. Dampers covering the tops of the flues *j* control the heat in the chamber and by keeping the side walls, floor and roof heated it should not be difficult to keep a continuously uniform temperature in the heating chamber when the fuel pressure is constant and burners are used that will give a steady blast. By forcing the flames to travel through the numerous small openings between the combustion and heating chambers, an even distribution of heat is obtained in the heating chamber and there should be no variation in temperature between the front, middle and back, top and bottom or any other two places.

The spring plates must be heated to about 1000 deg. C. to enable the hand fitters to bend them enough to make them fit the leaf below, which means that the furnace must be maintained at that temperature at least. To heat steel to a hardening temperature of between 800 and 820 deg. in such a fire is very difficult. A thermo-couple pyrometer is the only practical one for this kind of commercial work and that would only measure the temperature in the heating chamber of the furnace. Thus the hardening tem-

perature must be judged with the eye by the color of the steel and it is impossible to keep within a range of 150 deg. in a day's run, dark clouds obscuring the sun often causing a greater variation than this. The proper drawing temperature is between 375 and 475 deg. C., and it is also impossible to get the drawing temperature within 50 deg. of the correct figure in a furnace that is heated to 1000 deg. C. Most quenching oils have a flash point between 250 and 325 deg. and burning off the oil only means that these temperatures have been reached in the oil. The steel might be 25 deg., or even more, below this and to leave it in the furnace for a longer time to absorb the correct heat is only a matter of guess work.

Accuracy in heat treatment temperatures is of vital importance to the strength, wearing qualities and resistance to stresses of springs. Numerous tests have shown that a variation of 25 deg. C. in the hardening temperature of the springs has made a difference of over 2000 lb. in the elastic limit of the metal, while variations of the same extent in the drawing temperature have made differences as great as 5000 lb. The tensile strength is changed in the same proportions, while the reduction of area shows an even greater percentage of difference. The resistance to alternating vibrational stresses, such as springs actually get in service, is reduced something like 20 per cent. by a difference of 25 deg. in the hardening temperature. One series of tests gave an average of 42,550 alternating bends before breakage occurred when the spring leaves were hardened at a temperature of 760 deg. C. and only 35,525 when they were hardened at 790 deg., which means that if the hardening temperature is 30 deg. too high the life of the springs is shortened nearly one-fifth. If it were 30 deg. below 760 deg., it would be below the transformation point of this steel and the spring would settle and take a permanent set under the load. With a three-



Fig. 6—The Spring Plates After Being Taper Rolled and Having the Eye Formed

chambered furnace, such as is shown in Fig. 5, or with three separate furnaces, the correct temperature for pinching the springs can be maintained in the heating chamber *a*, the correct hardening temperature in *k* and the correct drawing temperature in *m*. Pyrometers could then be successfully used as the spring plates could be left in each

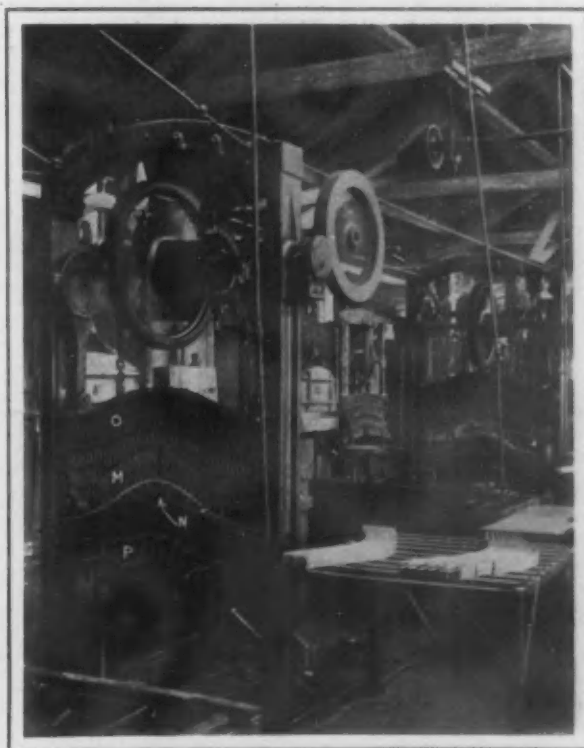


Fig. 7—The Spring Shaping Machines



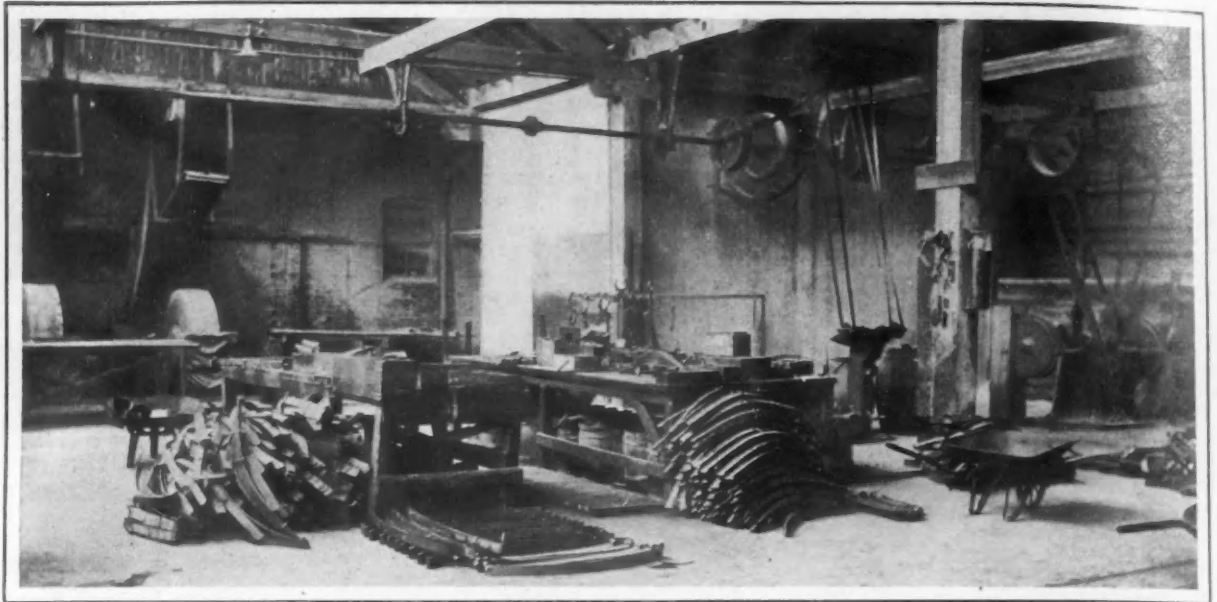


Fig. 8—The Grinding and Polishing Room

heating chamber until they absorbed all of the heat. The temperature of the furnace, as read on the indicator, would be that of the steel in the furnace. A number of sets of these furnaces are required for an output of springs that is large enough to be profitable and it would thus pay to have one man do nothing but keep the furnaces at the desired temperature and calibrate the pyrometers to keep them reading properly.

Odd sizes and small lots of springs are pinched to shape and hardened and tempered by the hand fitters at the first fire or furnace H, Fig. 4. A spring that has just been finished is shown on the fitter's table at K, and it will be noticed that there is an opening between all of the leaves that gradually gets smaller toward the top of the spring. This camber must be worked out accurately and when the spring is in use all strains put upon it will be equally distributed to all of the leaves and throughout the entire length of the spring. If the leaves lay close together, without bolting or clamping, each deflection of the spring would cause the bulk of the strains to center themselves on the bottom leaf or main plate, and it would not be able to carry the load very long. When the center bolt is put in and tightened up the leaves of the spring K fit together for their entire length. This draws the bottom plate upward for the greatest distance and each succeeding leaf

is drawn up an amount which decreases toward the top. In this way each leaf from the top downward takes its full share of the load before the next one is given any undue strain and the bottom plate is reserved for the final maximum stress. In this particular spring the second leaf has been left longer than is needed, so that it can be wrapped around the eyes of the main plate to further add to their strength. One of the largest springs built, which contains 24 leaves and is to be installed in a motor truck at New Orleans, is shown on the fitter's trough and bench at L. On the rack at the back of the table are located the spring patterns that the fitter uses for the various styles of springs.

A row of spring shaping machines that the Harvey Spring Company has improved and built for its own use are illustrated in Fig. 7. The keys at M and N can be adjusted to form any shape of spring that is desired; a cold spring plate of the proper shape being laid on the keys at N that are adjusted to fit its under side, after which the keys at M are adjusted to fit the top. A red hot plate is then taken from the furnace at the left, placed on top of the cold plate and the machine is operated to squeeze the two together. The thrust of the keys is compensated for by the springs at O and P. In these machines the spring leaves are fitted together much better than it can be done by hand fitters. Since the machines are more powerful than men's arms, the leaves do not have to be brought to as high a temperature when bending them to shape and the furnaces can thus be maintained at temperatures which are slightly above the transformation point of the steel and there is no necessity for overheating the plates. Most of the overheating which weakens springs by coarsening and crystallizing the grain is done in furnaces that are operated by hand fitters. The softer the steel the easier it can be pinched to a fit on the under leaf, and as this is usually piece work, there is always a strong incentive to raise the temperature of the metal. The temperature in such furnaces has often been shown by a portable pyrometer to be from 1100 to 1200 deg. C., and it is no wonder that spring breakages frequently show crystallization. It is often stated that vibrations, such as springs receive in service, cause crystallization. All the investigations and tests conducted along this line, however, prove that no such action takes place. The steel was bad at the start or this granular structure would not be present, the only cause for its presence being the heat treatment the metal receives. Breakage from vibration is caused by the crystals of the steel sliding past one another and pulling away from the other crystals to which they are attached as they slide, thus destroying the cohesive force that binds them together. At first one crystal starts to slide, and then another and another until a slip plane is established, and when this spreads far enough to extend entirely across the metal breakage occurs. A fine-grained steel will stand the alternating vibrations much

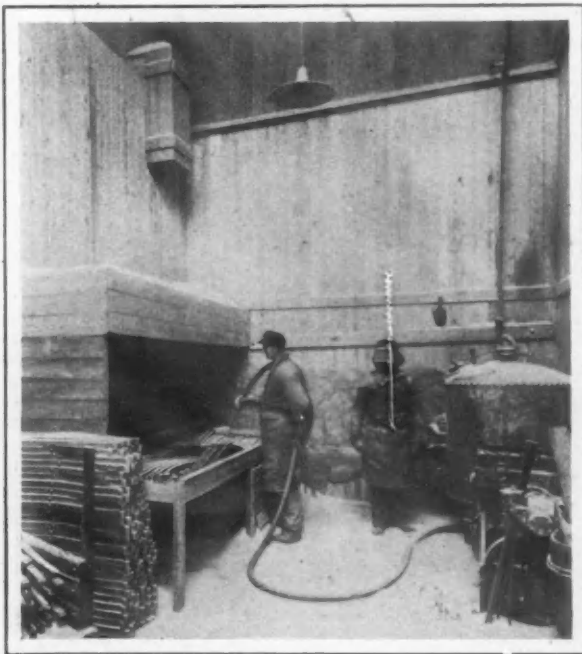


Fig. 9—The Interior of the Sand Blast Room



longer than one that has been coarsened by overheating, and a steel that has been correctly heat treated will last many times as long in service as one whose grain is crystallized.

Machines of the same type as those shown in Fig. 7 have been used for some time. They could not, however, be accurately adjusted, and the spring leaves did not fit together properly. When the leaves were squeezed together and while they were gripped in the machine, water was sprinkled on them from a hose and they were called hardened. These water-tempered springs were the cheapest kind and the machine-made springs were brought into disrepute. Much more accurate work has long been turned out by machines in all other lines of the steel industry than could be done by hand labor. Thus, all that was needed in this case was to improve the machine so it would fit the spring leaves more closely and then adopt more accurate and scientific means for hardening and tempering. Now when the leaves are squeezed together in a machine they are sprinkled with water to set them so that they will not warp out of shape, but this is not called hardening. Instead, they are taken to a furnace in which the temperature is uniform and accurate for the hardening and tempering operations. There are no good reasons why these leaf springs cannot be heat treated as accurately as gears or any other steel product.

The corner of the shop in which the springs are ground and polished is shown in Fig. 8. The spring leaves, after passing through many fires, are black oxidized and scaled,



Fig. 10—A Corner of the Shipping Room

and as they are usually painted, it is necessary to clean off this scale and oxide, so that they will have a bright surface to which the paint will adhere. Grinding on stones was the first method employed for this work, and the grindstones that are still used for some springs are shown at the left. Emery wheels were next adopted, as they were quicker and produced a smoother finish, and these are shown at the right. This firm was the first to install a sand blast for polishing springs and this is housed in the room in the center. It was found that the sand blast gave the springs a white, satiny surface, to which the paint would adhere much better than when they were ground on sandstones or emery wheels as well as doing the work cheaper. The interior of the sand blast room is illustrated in Fig. 9. Steel rods in a wooden frame at the left form a rack on which the springs are placed while being sand blasted. The springs are shown in position on this rack and the man is holding the nozzle of the hose through which the sand is forced from the apparatus at the right that supplies the sand and the air.

A corner of the shipping room is illustrated in Fig. 10, showing the stacks of completed springs that are waiting to be loaded on the freight cars which stand outside the door at the left, the floor of this room being on the same level as that of the freight cars. The special feature of

the shipping room is the neatness and simplicity of the racks which are formed by fastening horizontal rods to the I-beams in the ceiling and similar rods in the floor, vertical rods being fastened to them. The vertical rods are fastened in such a way that they can be moved along the ceiling and floor rods, thus enabling the racks to be adjusted to suit the size and shape of any spring that it is desired to stack in them.

### New Jersey and New York Labor Measures

Manufacturers and representatives of their associations in the vicinity of New York City have latterly been spending a good part of their time at State capitals. Some of those in New Jersey, particularly, have been much engaged in this manner. A delegation of the Newark Foundrymen's Association appeared March 10, with others interested, before an Assembly committee of the New Jersey Legislature to oppose the bill which proposes the prohibition of the employment of women as coremakers. The hearing was postponed without any evidence being taken to March 12, but was not concluded on that day and put over to March 17. Appearances were made also March 10 by members of the Newark Association and other employing interests in favor of Assemblyman Bennett H. Fischler's bill which was designed to protect the right of a youth to learn a trade by making interference illegal. Labor unions were strongly represented at the hearing on this bill and the debate became decidedly warm, lasting three hours.

The labor leaders attempted to befog the issue by dragging in the question of child labor and made much of the word "exploitation." They also asserted that the bill would operate to deprive journeymen mechanics of employment. The employers' speakers declared that child labor did not enter into the question; that the present industrial system does not supply all the skilled workmen which the State needs and that no boy should be deprived of rights which unquestionably belong to him. Another hearing was scheduled to take place March 17 on an anti-injunction measure now before the Senate of the same Legislature. It involves the much mooted question of defining conspiracy.

The New York and New Jersey Branch of the National Metal Trades Association is opposing a bill now before the committee on labor and industry in the New York Assembly which provides that it shall be unlawful for any person, corporation, foreman, superintendent, or manager to require or permit any employee to

use automatic hammers whose piston stroke exceeds 3 in. in length and 11/16 in. in diameter, in the operation of which it is necessary to resist the recoil and vibration of the stroke by the pressure of the hands, arms or body, unless there is another competent person to assist in the operation of the hammer. The assistant shall be able, if necessary, to take turns in operating the hammer. In case of violation, a fine of not less than \$50 nor more than \$500, or imprisonment for not less than three months nor more than one year, shall be imposed. The bill also prescribes that each day an employee is allowed to violate the provisions of the bill shall constitute a separate offense.

The association also is opposing an Assembly bill, which has been reported to second reading, making it unlawful for any employer to impose a fine upon a person in his employ for any dereliction of duty, violation of rules or for any other reason, or to make any deduction from the wages of such person for any other reason. Opposition is being made also to a bill before the committee on judiciary of the Assembly which proposes to make April 2, Jefferson's birthday, a holiday.

The foregoing bills are by no means all to which New York and New Jersey employers have found it necessary to devote their time and attention; usually because of proposals which are inimical to business interests.

# Tool Steel from a Salesman's Point of View\*

## Adaptations of the Various Classes to Definite Lines of Service—Suggestions for Heat Treatment—Chrome-Vanadium Steel

BY C. M. BIGGER,†

It must be recognized that not all salesmen in the field have more than a preparatory knowledge of the processes of manufacturing the numerous grades of tool steel. The fact is, unless the salesman has spent the early part of his life in actual mill practice he is compelled to glean his information from books or from mill employees. Unlike poets, a recent writer has said, "a few salesmen are born, most of them are made, and a great deal of attention must be paid to the making." Blessed is the salesman who has had several years of actual manufacturing experience.

With the high grade tool steel manufacturer only three general classifications are usually recognized, under present conditions. These are what are known as the water-hardening carbon steels, alloy steels, and high speed steels. The processes and methods of tool steel manufacture have wholly changed within the past ten or twelve years. In addition to the usual grades and tempers of carbon steels, numerous alloy steels, such as nickel steel, nickel-chrome steel, nickel-vanadium steel, chrome steel, chrome-vanadium steel, vanadium steels, tungsten and tungsten-vanadium steels, are made to meet countless conditions and requirements.

### Carbon Steels

Let us first refer in our discussion to what are generally known as the water-hardening carbon steels. In 1908 a board on tool steel, appointed by the Navy Department to investigate the quality, shape, size and brands of tool steels to be used in the Navy Department, reported these requirements:

"That first in importance of the desirable qualities tool steel should have is that it shall be of uniform quality throughout for each and every grade.

"That it shall be of such chemical composition that it is not likely to fire crack in hardening, under proper conditions.

"That this chemical composition should be such as to render it as little liable as possible to be ruined through carelessness in forging the tools or in subsequent grinding, and that the tools shall be as strong as practicable in the body.

"That the composition permit of forging through a comparatively wide range of temperatures; and, finally, the steel should be free from seams, cracks and other surface imperfections."

When one reads these requirements he is impressed with the precautions that the manufacturer must take to make his steel "fool proof."

It will be found by examining the catalogues and products of nearly all the American manufactures of crucible tool steels that the carbon steels generally group themselves into three classes: First a grade that sells at about 7 cents per pound base; second, a grade that sells at about 12 cents per pound base, and, third, a grade that sells at about 18 cents per pound base. Each of these grades is made to meet a certain class of trade and it will be found that all the manufactures are well equipped to yield a product of high standard in each class. As we all know, each of these grades are made in various tempers; that is, they contain varying percentages of carbon to suit the different conditions of service, and the heat of forging, annealing or hardening, and the temperature to which the temper is drawn after hardening is regulated by the amount of carbon they contain. In general steels containing a lower percentage of carbon require a higher heat in each operation than those containing higher percentages of this element.

### Temper and Quality

It may be well to state here that quality and temper of steels are two very different things. The temper of steel does not constitute its quality. The different grades and qualities of steel are made in the same temper, and the price is regulated by the quality. Quality in this sense is determined by the grades of material used in the manufacture of the steel, while temper means the carbon contained in the steel. I wish to call attention to the fact that the word temper in this sense must not be confused with the same word used in relation to drawing a hardened piece of steel. In drawing we say, draw to a light straw temper, a dark straw temper, a dark blue temper, a light blue temper, a black temper, as the case may be. In these connections the word temper has no relation whatever to the carbon contained in the steel. A great many times I have heard men say they wanted "a high carbon steel," when in reality they wanted only a high grade of carbon steel. You can get the same amount of carbon in each of the grades mentioned.

In carbon steels the manufacturer usually runs his tempers in six classes: First, steels containing from 0.70 to 0.80 per cent. carbon; second, steels containing from 0.81 to 0.90 per cent. carbon; third, steels containing from 0.91 to 1.00 per cent. carbon; fourth, steels containing from 1.01 to 1.10 per cent. carbon; fifth, steels containing from 1.11 to 1.20 per cent. carbon, and sixth, steels containing from 1.21 to 1.30 per cent. carbon. These various tempers are used in the different grades for about the following purposes: In the 7 cent grades, steels containing from 0.70 to 0.80 per cent. carbon are used for such work as anvil facings, pinch bars, blacksmith's tools, drift pins, etc.; steels containing from 0.81 to 0.90 per cent. carbon, for peen hammers, skate blades, cold chisels, etc.; those containing from 0.91 to 1.00 carbon, for chuck jaws, springs, hatchets, etc.; those containing from 1.01 to 1.10 per cent. carbon, for lathe centers, auger bits, axe bits, etc.; those containing from 1.11 to 1.20 per cent. carbon, for files, cold cutters, stone cutting bits, and similar purposes, and those containing from 1.21 to 1.30 per cent. carbon, for dies for heading machines or similar purposes. The best grades in the different tempers are used for such purposes as button sets, band saws, drop forging dies, cutlery, large and small taps, threading dies, milling cutters, twist drills, chasers, gravers, and many other purposes.

### Hardening and Tempering

Considerable progress has been made in the hardening and tempering of carbon steels within the last few years; but a visit to the hardening rooms of many plants that are supposed to be up-to-date in all particulars reveals the fact that adequate equipment for hardening and a knowledge of the critical points of steel, with the changes that take place when it is heated, as well as others that occur in drawing the temper, are in many cases lacking. The results of not heating or drawing the temper accurately and the irregularities of antiquated methods of forging or treating have in a great many cases wrought disaster to a piece of good steel, and the entire blame has been placed on the manufacturer.

It is impossible in the scope of this paper to give accurate forging or hardening tempers for each grade or temper of steel, or even to state the exact degree to which they should be drawn. In general when forging, however, it is good policy to heat slowly and uniformly at first, before raising the temperature to the exact forging point, to insure an even distribution of heat throughout the piece. When heating in a blacksmith's forge the fire should be kept clean and of ample volume to surround the piece completely. Always use extreme care so that the

\*From a paper read before the Metal Trades Foremen's Club, Dayton, Ohio, February 27, 1913.

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air blast does not strike the steel when heating; also see that there is a good bed of clean fire between the tuyere and the steel. Dirty fires are the cause of many failures and in many cases of local overheating or burning.

When heating for hardening ample time should be taken to heat the steel slowly to the hardening point. Extreme care should be taken to protect it from the action of a direct furnace flame and also from any other causes that may interfere with successful hardening. The greater the care the better the results. Always be sure of a perfect distribution of heat. Avoid overheating thin parts or edges.

#### A Suggestion for Hardening Expensive Tools

A good suggestion to follow in hardening tools when the operator does not know the amount of carbon contained in the steel is to cut a small piece from the end of the original bar and harden it at different temperatures. A hardness test with a file and the appearance of a fracture will enable you to determine the least possible hardening heat that it will be necessary to give the steel to insure the proper hardness. This plan should be followed especially when making up expensive tools, as the results obtained will more than compensate for the amount of labor expended.

Best results in hardening are obtained when the heating is done in a muffle furnace, either oil or gas fired, as in these furnaces the steel does not come in direct contact with the flame. The successful hardening of delicate tools depends largely on the condition of the atmosphere to which the steel is subject; whether it is oxidizing, reducing or neutral in character. Carbon steel, it is generally conceded, can be hardened most favorably in an atmosphere where the oxygen in the air is entirely consumed. In an atmosphere of this nature the scaling or oxidation is reduced to a minimum. It is because of these general conditions that the electrically heated furnace is now spoken of so highly for hardening purposes.

It is very evident that to get the best results from tool steels they must be hardened and tempered properly. To do this certain amounts of apparatus are necessary, such as proper heating furnaces, adequate cooling baths, the proper tools and tongs and, last but by no means least, a good pyrometer. Whether the operation is forging, hardening or tempering, there is for each grade and temper of steel, and the particular use thereof, a well defined temperature point that alone gives the best results in work. A marked variation from this temperature may do irreparable damage. The use of a suitable pyrometer is recommended for all hardening purposes, and a pyrometer or thermometer for obtaining the temperatures of all drawing baths. When using a pyrometer reasonable care must be exercised to see that the readings are truthful and reliable. Pyrometers may frequently go wrong and unless the operator is an experienced hardener the results may be disastrous.

#### Cooling Baths

In most cases water is used as a hardening medium for carbon steels. Where extreme hardness is desired, a solution of salt water or brine or ice water can be successfully used. In other cases articles to be hardened are quenched in a bath of water and before they are cold or have ceased contracting they are removed from the water and placed in oil. This is true of such articles as milling cutters, some forms of punching dies, taps, reamers, etc. Some steels require to be quenched in oils only. Lard, fish or whale oil is preferable for this purpose, but any recognized light tempering oil will do. However, heavy fatty or mineral oils should be avoided. In all cases the cooling baths should be of ample size, and a temperature as nearly uniform as possible should be maintained.

All tempering of carbon steel should be done in an oil heated bath or other medium by which the drawing temper can be kept uniform. For taps, dies, reamers, milling cutters, etc., relieving the strain is all that is required. In other tools where toughness is the predominating factor the temper may be drawn slightly more.

When we say a piece of steel is decarbonized, we mean that the surface, for a few thousandths of an inch deep, has lost some of its original carbon during the process of annealing. All annealed steel is more or less decarbonized, and when intended for tools of any de-

scription that are to be subsequently hardened, sizes large enough to permit the removal of at least  $1\frac{1}{32}$  in. on a side should be ordered. Failure to remove the outer surface of annealed steel of all grades or tempers will consequently give trouble in hardening.

#### Alloy Steels

The term alloy steel is used to distinguish steels containing nickel, chromium, vanadium, titanium, or other elements in varying percentages, from the carbon steel in which the characteristic properties are dependent upon the presence of carbon alone. Up to the last two or three years nickel steel was perhaps the most used of all the alloy steels. It is usually made in the open-hearth furnace and contains from 0.20 to 0.50 per cent. carbon and about 3.50 per cent. nickel. Lower carbons than these are sometimes used for case hardening purposes. This steel has many excellent mechanical qualities and is generally conceded to be a good free cutting steel.

Referring to chrome steel, I am personally familiar with a variety of this steel containing from 0.80 to 1.20 carbon and from 3 to 3.50 per cent. chromium. This steel is used specially for hot work with excellent results, as for gripper dies, bolt header dies, riveting dies, and what are known in fabricating or boiler shops as bull dies. It can be easily annealed under exactly the same conditions as carbon steel, excepting that the annealing temperature is slightly higher; in this state it is very free cutting. When properly hardened and used for the purposes stated above the users expect to get from six to ten times as much work from this steel as from ordinary die steels. Actual records show where riveting dies have driven over a quarter million  $\frac{5}{8} \times 2$  in. rivets without redressing.

Chrome-vanadium steels of numerous types are now manufactured. The service and test records of this class of steel show remarkable results and its use will be greatly increased in the near future. Vanadium in steel is supposed to impart anti-fatigue properties. Under proper heat treatment this steel has been made to assume higher physical properties (expressed by the elastic limit, tensile strength, torsional test, impact test and bending test) than any other type of steel.

It is largely used in automobile construction for driving axles, for gears, pinions, pins, pressed or stamped parts, valve and valve stem, etc.; in fact, it gives excellent service in any parts calling for strength or durability. It is especially recommended for all spring requirements and it is guaranteed to have three times the life of carbon steel spring.

Tests were made recently by an associate salesman of my firm to determine the relationship between carbon spring steel and chrome-vanadium steel for motor-cycle springs. The greatest durability was the prime requisite of these springs and the test was of vital importance. A very ingenious device was constructed so that the end of each spring was made to oscillate under force from a shaper at the rate of 4980 vibrations per hour. It was found under proper heat treatment that carbon steel stood this test for an average of 36 minutes only, while chrome-vanadium steel averaged 5 hours and 40 minutes.

The chrome-vanadium steels require a special heat treatment. The springs referred to were heated to 1350 deg. Fahr. and quenched in oil; the temper was then drawn to 700 to 900 deg. Fahr.

Chrome-vanadium steel for gears is proving the superiority of this class of steels. For this purpose it is made in case hardening and oil hardening tempers. The oil hardening type contains about 0.45 to 0.60 per cent. carbon, so that by merely heating to the proper temperature and quenching in oil the gears are made sufficiently surface hard to withstand all ordinary wearing conditions, while the core is tough and strong.

#### High Speed Steel

Since 1901 high speed steel has had a rapid growth and extensive sales. Only those who have kept in close touch with its manufacture and uses can appreciate the tremendous amount of work in the way of efficiency tests that has been necessary to bring it to its present state of perfection. With the introduction of vanadium into this grade of steel about 1908 a very important step was taken. Now all good grades of high speed steel contain more or less of this element. [The speaker here quoted from the



handbook of his company relative to the use of vanadium in high speed steel.]

In regard to this, numerous tests have proven that a steel that will cut at 10 per cent. faster speed will last twice as long between grinding (if the speed is not changed) and a steel that will stand a 20 per cent. faster speed will run four times as long between grindings. A steel that will stand 30 per cent. faster speed before it reaches the breaking-down point will last eight times as long without sharpening, if the same speed is used.

Each addition of 0.3 per cent. of vanadium adds 10 per cent. to the possible cutting speed and doubles the life of a tool at the same speed and feed. It has been shown that 0.3 per cent. vanadium allows 10 per cent. increased speed or 10 per cent. more metal removed in same time; that 0.6 per cent. vanadium allows 20 per cent. increased speed or 20 per cent. more metal removed in the same time; that 0.9 per cent. vanadium allows 30 per cent. increased speed or 30 per cent. more metal removed in the same time.

Stating the effect in terms of increased times between grindings, it has been shown that 0.3 per cent. vanadium doubles the time between regrindings, that 0.6 per cent. vanadium quadruples the time between regrindings, and that 0.9 per cent. vanadium gives eight times as much metal cut between grinding as the same speed and feed.

I contend that high speed steels containing vanadium will run much longer between sharpening, in proportion to the quantity of vanadium they contain, up to 1¼ per cent. High speed steels are used for such purposes as lathe and planer tools; it is invaluable for swan-neck tools; special dies, which have heretofore required very great care in hardening; punches, boring tools, cutters, straight drills, twist drills, special taps, hard wood knives and all kinds of milling cutters, and it is especially valuable for involute or gear cutters in which accuracy of form and long life are necessary. These steels are usually furnished annealed by the manufacturer and it is the best policy to permit the manufacturer to do all the annealing for the user. However, should it be found necessary to anneal a piece of this steel the following is a good method of procedure:

"For all annealing purposes use an iron box or pipe of sufficient size to allow at least one-half inch of packing between the steel to be annealed and the sides of the box or pipe. Pack carefully with powdered charcoal or lime. Cover with a cap which should be air tight. Heat slowly to a full red heat; say, about 1500 or 1550 deg. Fahr., and hold at this heat from two to eight hours, depending on the size of the piece being annealed. Cool as slowly as possible and do not expose the steel to the air until it is cold."

Electrically or gas fired furnaces designed for high heats are now made to do very satisfactory work in hardening this class of steel. Tools to be hardened should be heated to a white heat just below the blistering point. The heat should be the highest possible in view of the importance of preserving the cutting edge. The higher the heat the better the results. Proper care should be taken to heat slowly and uniformly to the proper hardening temperature, also to avoid overheating thin parts or sharp edges.

Tools of this class of steel can be either quenched in oil or other semi-active medium, or in some cases the whole tool can be cooled in the air blast. In all cases the temper should be drawn to relieve the strain, or to the proper degree to get the best results.

Secretary W. M. Corse, Buffalo, N. Y., in announcing that the next annual convention of the American Institute of Metals will be held at Chicago, October 14-17, says that headquarters will be at the Hotel La Salle and that the meeting room will be on the 19th floor adjoining that of the American Foundrymen's Association. This is a convenient arrangement for foundrymen who wish to attend some of the sessions of each organization. H. W. Gillett, Morse Hall, Ithaca, N. Y., is chairman of the committee on papers relating to the non-ferrous metals.

The Marine Boiler Works, Toledo, Ohio, has received an order from the Great Lakes Engineering Works, Detroit, Mich., for 12 Scotch marine boilers, 13 ft. 2 in. in diameter by 12 ft. long, for three car ferryboats for the Grand Rapids & Northwestern Railway Company.

## Mineral Production of Canada in 1912

The Department of Mines, Ottawa, has issued a preliminary report, subject to revision, which puts the total value of the mineral production in Canada in 1912 at \$133,127,489, based on direct returns from mine and smelter operators. The largest previous production was in 1910, compared with which that of 1912 shows an increase of \$26,243,866, or over 24 per cent. The per capita production in 1910 was \$14.93, and this increased in 1912 to over \$18. The only new camp of importance to contribute largely to the year's output was Porcupine, the gold production of which was about \$1,750,000. A slight scarcity of labor was reported, particularly in connection with the asbestos and clay working industries. There were comparatively few labor disputes to interfere with output, the principal difficulties being a strike of coal miners on Vancouver Island, beginning in September, and a dispute at Porcupine toward the latter part of the year. The total coal and gold production were but slightly affected thereby. A substantial increase in price in most of the metals, which took place early in the year and continued throughout, had a very important bearing on the year's operations and contributed largely to the increased value of the output.

The production of the more important metals and minerals is shown in the following tabulated statement in which the figures are given for the two years, 1911 and 1912, in comparative form:

	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Copper .....	Lb. 55,648,011	6,886,998	77,775,600	12,709,311
Gold .....	Oz. 473,159	9,781,077	607,609	12,559,443
Pig iron .....	Tons 917,535	12,307,125	1,014,587	14,550,999
Lead .....	Lb. 23,784,969	827,717	35,763,476	1,597,554
Nickel .....	Lb. 34,098,744	10,229,623	44,841,542	13,452,463
Silver .....	Oz. 32,559,044	17,355,272	31,931,710	19,425,656
Other metallic products .....		411,332		982,676
Total .....		57,799,144		75,278,102
Less pig iron credited to imported ores .....	875,349	11,693,721	978,232	14,100,113
Total metallic .....		46,105,423		61,177,989
Asbestos and asbestic .....	Tons 127,414	2,943,108	131,260	2,979,384
Coal .....	Tons 11,323,388	26,467,646	14,699,953	36,349,299
Gypsum .....	Tons 518,383	993,394	576,498	1,320,883
Natural gas .....		1,917,678		2,311,126
Petroleum .....	Bbl. 291,092	357,073	243,336	345,050
Salt .....	Tons 91,582	443,004	95,053	459,582
Cement .....	Bbl. 5,692,915	7,644,537	7,120,787	9,083,216
Clay products .....		8,359,933		9,343,321
Lime .....	Bu. 7,533,525	1,517,599	7,992,234	1,717,771
Stone .....		4,328,757		4,675,851
Miscellaneous non-metallic .....		2,142,842		3,364,017
Total non-metallic .....		57,115,571		71,949,500
Grand total .....		\$103,220,994		\$133,127,489

\*Net tons throughout.

The subdivision of the mineral production in 1911 and 1912 by provinces was approximately as follows:

Province.	1911		1912	
	Value of production.	Per cent. of total.	Value of production.	Per cent. of total.
Nova Scotia .....	\$15,409,397	14.93	\$18,843,324	14.15
New Brunswick .....	612,830	0.59	806,584	0.61
Quebec .....	9,304,717	9.01	11,675,682	8.77
Ontario .....	42,796,162	41.46	51,023,134	38.33
Manitoba .....	1,791,772	1.74	2,314,922	1.74
Saskatchewan .....	636,706	0.62	909,934	0.68
Alberta .....	6,662,673	6.46	12,110,960	9.10
British Columbia .....	21,299,305	20.63	29,555,323	22.20
Northwest Territories .....	4,707,432	4.56	5,887,626	4.42
Dominion .....	\$103,220,994	100.00	\$133,127,489	100.00

In accordance with a decree of the United States District Court for the northern district of Illinois, April 8 has been set as the date for the sale of the Chicago properties of the Allis-Chalmers Company. The properties comprise what is known as Works No. 1 on Elston avenue, north side, which plant has been idle for some time, and Works No. 2 at West Twelfth and Rockwell streets, on the west side. It is stipulated that for No. 1 works all bids are to be accompanied by a deposit of \$50,000 cash or \$100,000 in bonds, and for No. 2 works \$100,000 in cash or \$200,000 in bonds.

The Shorthill Steel & Iron Works, whose plant is being constructed at Perry, Iowa, has opened its general offices in the Silverburg & Lince Building, Des Moines. President C. R. Speers states that the company has orders booked for several months ahead.

## Turret Boring and Turning Tool Post

Improved Design for Handling a  
Wide Range of Work Rapidly

For use in the wide field between the engine lathe and the semi-automatic lathe or the hand turret lathe, the Phoenix Mfg. Company, Eau Claire, Wis., is manufacturing a duplex turret tool post from designs of C. M. Conradson. The use of this tool post is not recommended where the necessity of a turret lathe is clearly indicated but at the same time it is emphasized that there are a number of small jobs where work can be finished in a lathe equipped with this tool post before the turret tool can be started and on many jobs it will keep up with the turret lathe. It is thus especially fitted for use in a manufacturing shop handling small lots of work or for the jobbing shop. One of the features claimed for the tool post is

of the main bar, a great variety of these thus being used. A ring nut, *f*, is screwed on the split taper collet *i* and engages with an annular groove in the tubular stem of the turret. The function of this nut is to engage teeth in the turret and to drive the split ring *i* firmly into the taper annular recess in the sleeve *b*. In this way the turret is simultaneously indexed and clamped at its rear end, this making the two parts *b* and *c* equivalent to a solid block of steel. There are eight teeth and corresponding spaces and a ball finder, *j*, is provided which automatically registers the turret when it is brought approximately into the indexing position. The turret is simultaneously indexed and clamped by the split ring nut *h* which draws the turret to the right, engaging the teeth and at the same time turret and taking up all lost clamping ring *i* being split. A different types of tools can be which draws the turret teeth and spaces on rigidly clamping the motion, the bevel large number of different used with this post.

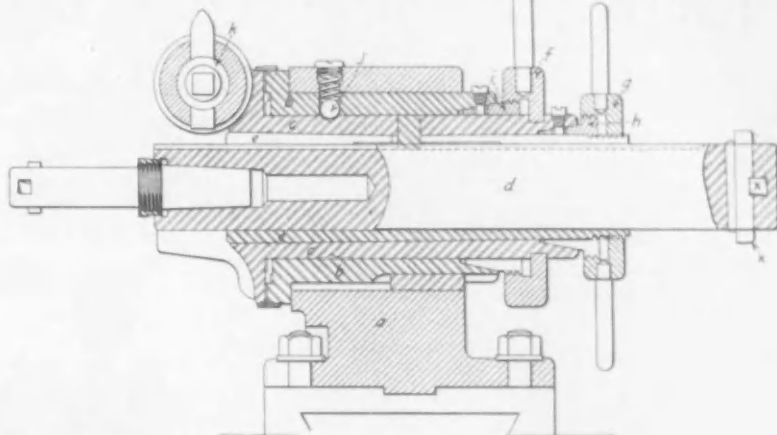
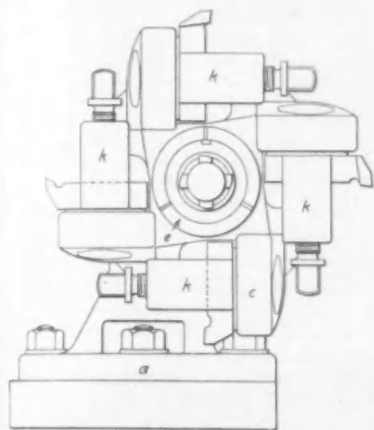


Fig. 2—Constructional Details of the Tool Post

that changes in design can be readily followed on account of the simplicity and wide scope of the tool equipment, which is necessary. It is emphasized that with this tool post it is simply necessary to have a sufficient number of boring bars to cover the range from the smallest hole to be bored to the smallest that can be bored by the main bar, while a dozen turning tools will cover all the ordinary requirements. Fig. 1 shows the tool post installed on a lathe while constructional details are given in Fig. 2.

From Fig. 2 it will be noticed that *a* is a bracket attached to the cross slide in place of the compound rest. This bracket supports the steel bushing *b* carrying the turret *c* which can be rotated or slid. Teeth cut in the face of this bushing engage with corresponding ones in the opposing face of the turret which is indexed in this way. The turning tools are carried in the tool post *k* held in bosses on the front face of the turret and the boring tools are held in a reversible boring bar, *d*, at one end of which is generally placed a pair of interlocking cutters, *x*, forming four boring cutters. A split collet sleeve, *e*, is usually supplied for holding smaller boring bars at the other end

In actual operation, a piece with a 13½-in. flange was finished in about 25 min. In one case where this tool post was installed it is stated that it was necessary to reduce the depth of the cut being taken as the cross slide would have been broken if this rate had been continued. In another shop the tool post has stalled a 24-in. lathe on a number of occasions. A reaming and tapping attachment can be supplied for the tool post, thus converting the engine lathe into a boring, turning and facing machine.

### How a California Town Has Grown

The following interesting statement is taken from the Weekly News Bulletin of H. M. Byllesby & Co., engineers, Chicago:

In 1900 Richmond, Cal., did not exist. In 1901 the population was 100, the Santa Fé Railroad having started in that year the construction of shops, roundhouses and freight yards. Later the Standard Oil Company located its great refinery, starting with an investment of \$10,000,000. In 1905, when the population was 4000, the California Wine Association spent \$3,000,000 on a plant which is the largest winery in the world. Railroad construction and the entrance of new factories increased the population to 7000 in 1907. At this time plans for Richmond's inner harbor were taken up. In the next three years many other industries located in Richmond, including the Western Pipe & Steel Company, Pacific Porcelain Ware Company, California Furniture Company, Berkeley Steel Works and Los Angeles Pressed Brick Company, and in 1910 the population was 10,000. That year the Pullman Palace Car Company established its Western shops at Richmond. Other factories employing hundreds of men have established plants there, and to-day the city has a population of 16,000. The Sterling Fixture & Show Case Company will remove its plant from Oakland to Richmond and erect a \$40,000 factory. The Golden Gate Metal Extraction Company has also selected a site in Richmond and will erect a plant.

Efficient policy in selling and advertising and sales methods and advertising methods are to be discussed at a dinner meeting of the Efficiency Society to be held at the Aldine Club, Twenty-third street and Fifth avenue New York City, March 25.

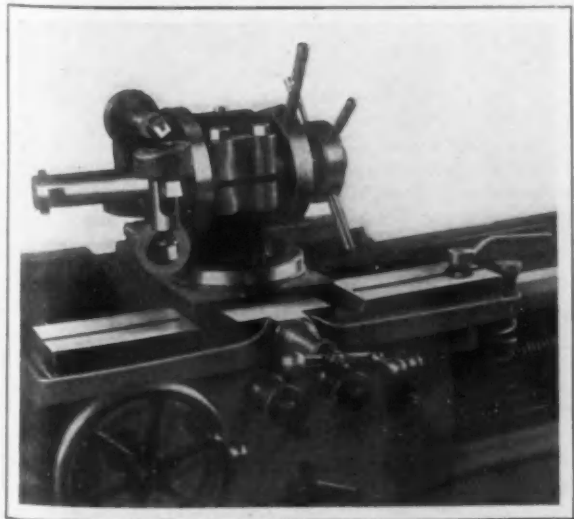


Fig. 1—The Conradson Turret Tool Mounted in a Lathe



## Employees' Activities at a Cleveland Plant

### Apprentices, Local Home Community and Musical and Benefit Associations of the Cleveland Crane & Engineering Company, Wickliffe, Ohio

BY F. L. PRENTISS

Welfare work among its employees has been given a great deal of attention by the Cleveland Crane & Engineering Company, Wickliffe, Ohio, and the management feels well repaid for its activities in that direction by having a loyal body of workmen who show a deep personal interest in their work and in the success of the company. Realizing that the ultimate success of any manufacturer depends both on the character of its organization and its products, the company has aimed to build up an organization that from the highest salaried employee to the youthful apprentice represents the highest degree of efficiency.

The human element has been given a great deal of consideration in the conduct of the company's affairs. This company not only makes cranes but makes the men who build them. The latter are given a start in the shop as apprentices and are helped along as rapidly as possible, being given better positions as fast as they are capable of filling them. Thus a spirit of contentment prevails; men are not constantly leaving to secure work elsewhere and many of the employees have seen long years of service with the company. The policy that has been followed has caused the men to take more than an ordinary amount of interest in their work and in the company's success, not laboring solely for the wages that they receive on pay day. In Wickliffe, where the plant is located, a suburban village of Cleveland, a thriving little community has grown up, composed of the company's employees.

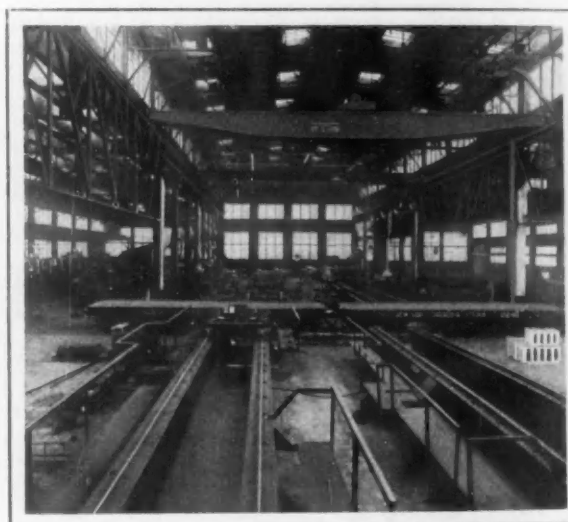
The welfare work of this company includes a school of apprenticeship, a bonus system, an allotment and the building of homes for employees and an aid society. In connection with these and of importance because it is a feature that adds to the human interest of the men and binds them closer to the organization is a shop band. It is needless to add that the band is a good one and one in which the men, whether they are a part of it or not, join with the officers in taking pride.

#### The School of Apprenticeship

The school of apprenticeship was organized to train the boys to become good mechanics and skilled in crane building in order to perpetuate the efficiency of the factory and to maintain at all times a competent staff of workmen. A class of fourteen of these young men meets every Monday evening for the study of mechanical drawing and on Thursday evenings for the study of mathematics and shop problems. These classes are taught by competent and practical men and the boys are ready pupils, anxious to learn and they devote their idle evenings to their studies. As each boy becomes more proficient he is given more difficult work, so that no in-

dividual ability is wasted. Many of the boys who started as apprentices are now holding responsible positions.

Only boys of families living in the immediate vicinity



Shop Interior Showing Erecting Floor

of Wickliffe are accepted, this rule being adopted so that the apprentices can live at home and have the benefit of parental authority. With this arrangement a good class of boys is secured and a standard of morals is established in the shop that is said to be much better than is found in the average plant. The apprentices are accepted only with the consent of their parents or guardians. They are paid at the rate of 10 to 20 cents an hour, their pay being advanced every six months. Each apprentice, on the satisfactory completion of his term, receives \$100 as a bonus from the company and also a certificate or letter of apprenticeship stating the merit of the holder.

#### The Bonus System in Vogue

The company's bonus system, separate from the apprenticeship bonus, was installed to instill in the minds of its employees the value of persistency and to make the number of absentees from work as few as possible at all times. The company acts on the theory that when a man is impressed with a view that if his work is worth being paid for it must be a valuable asset to an employer and if he is absent the employer suffers and loses, then that man will be more apt to appreciate the work that he does and not only will do more work but will do it



more accurately. Carrying this theory into practice the company established a 1 per cent. bonus system, the bonus being a gratuity paid the employee at the end of the year if he has not been absent from his work without proper cause more than one day a month. If he is sick or unavoidably detained he is excused and the time absent is not marked against him.

At the end of the year, if he has not been voluntarily absent more than 12 days he is allowed 1 per cent of his total salary for each year of continuous service with the company. For example, if his wages amount to \$1,000 a year he receives a bonus of \$10 for his year's attendance, but if he has been in the employ of the company for ten years his bonus will be \$100. This system has been found to be mutually profitable. It not only increases the output of the factory but also serves as an unusual stimulus to employees.

#### The Employees' Community Near the Works

This company has done a number of things along original and individual lines. One of these is the recent establishment of an allotment for its employees on a street named CRANE-ing Road in honor of its house organ. This allotment adjoins Euclid avenue, the main thoroughfare of the village with which CRANE-ing Road intersects and it is but a short walk from the plant. The suburban electric cars from Cleveland have a regular stop, No. 21, at CRANE-ing Road. The allotment is owned by the company and is occupied only by Cleveland Crane employees, to whom homes are sold on the property. This property will always be held exclusively for the homes of the employees. The company erects a home for an employee, which is paid for at the approximate rate each month of 1 per cent. of the total value. A very small



Drafting Room of the Apprentice School

payment down is generally required. Sometimes, however, no initial payment is required, this depending on the man. The houses are modern in construction, of cement stucco, and their owners take pride in keeping them spick and span. At the head of the street at the corner of Euclid avenue, C. C. Robbins, the secretary and general manager, has built a home, into which he recently moved from Cleveland. The street is one of Wickliffe's prettiest sections and it is an expression of thrift and love for home.

#### The Employees' Musical Organization

The Cleveland Crane band is a fully organized, well uniformed shop band of 30 pieces, composed entirely of men in the employ of the company. The band meets for rehearsal every Wednesday evening under the leadership of one of the best instructors who can be secured in Northern Ohio. The popularity of the band has made its services in demand in Wickliffe and vicinity. It has frequently called on to furnish music at open air entertainments at the country homes of many prominent Cleveland business men residing in the vicinity of the village. It has given concerts in Willoughby Park during

the summer and has proved one of the attractive features at the county fair. During the coming summer the band will give a series of weekly concerts in Wickliffe.

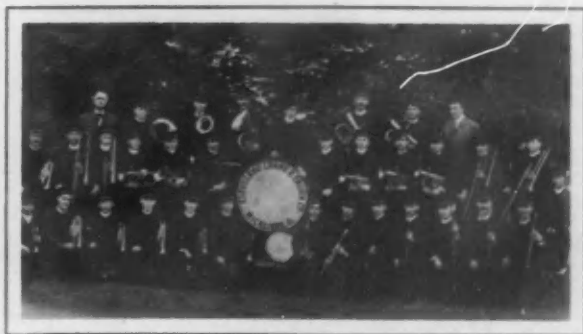
#### The Benefit Association

The company's aid society is a benefit association formed by its employees in October, 1911, its object being to assist the employee in case of sickness or accident and his family in case of death. This society is presided over by officers elected by the employees. The employees pay into the treasury monthly dues graded in three different classes. Class A pays 25 cents a month and in time of sickness receives an indemnity of 50 cents a day. All members earning less than \$1.25 a day must join this class. Class B pays 50 cents a month and in case of sickness gets \$1 per day. All members earning from \$1.25 to \$2.25 per day must enter class B. Class C pays 75 cents a month and in time of sickness receives an indemnity of \$1.50 a day. All members earning \$2.25 or more per day must enter Class C. A membership fee of 25 cents is charged for new members. All dues must be paid on or before the thirtieth of the month except in case of sickness. Members of Class A can draw \$34 in 12 consecutive months. Members of Class B \$68 and members of Class C \$102. In case of death \$50 is paid to the heirs to go toward funeral expenses. At the end of the year all surplus funds remaining in the treasury in excess of \$150 is divided among the members pro rata to the amount paid in. In 1912 forty members received aid, and \$409.25 was paid out on this account.

#### Growth of the Cleveland Crane Plant

The Cleveland Crane plant is one of the best equipped in the country for crane building. The plant is well arranged and provides a maximum amount of outside light. The growth of its business has necessitated the doubling of floor space within the past year. The offices have recently been remodeled and enlarged and modern office equipment installed. An efficient engineering department is maintained for designing cranes and solving the various mechanical problems of the company's clients. The plant adjoins the Lake Shore and Nickel Plate Railroads and private switches to the shop provide good shipping facilities.

At the head of the company is W. D. Sayle, who is identified with some of the largest manufacturing industries in Cleveland. In addition to being president of this company he is also president of the Cleveland Punch & Shear Works Company and the City Foundry Company in Cleveland and of the Ohio Machine Tool Company, Kenton, Ohio, and director of several other companies. The active management of the company is in the hands of C. C. Robbins, secretary and general manager, who has been actively associated with the building of cranes for a number of years. Previous to his connection with this company he was associated with one of the prominent engineers of the country and had charge of the erection of a large number of various plants. The other departments of the business are in the hands of experienced men who have grown up with the organization. Among these are W. A. Barber, chief engineer; A. C. Garnett, cashier, and W. F. Provo, purchasing agent. The sales department is under the management of R. E. Lucwick. The company has exclusive selling representatives in several of the industrial centers. The New York representative is J. R. Traver. F. P. Hurlbut is in charge of the Pittsburgh and vicinity territory and W. B. Foster is the western representative with headquarters at Chicago.



The Cleveland Crane Band

## Manganese Steel Castings

Exceptional Foundry Methods and Heat Treatment—Arrangements for Machining Large Work

BY JOHN HOWE HALL.\*

In *The Iron Age* for January 9, 1913, S. R. Stone's article "Manganese Steel for Machinery Parts" sets forth in a very able and thorough manner some of the characteristics and examples of the uses of manganese steel castings. It is the purpose of this article to give some further facts of interest.

In November, 1892, the first heat of manganese steel was successfully made in this country by the Taylor Iron & Steel Company (now the Taylor-Wharton Iron & Steel Company), working under license of the Hadfield patents. Its production since then has been continuous and increasing, as the valuable qualities of the steel have become more generally known and the field of application extended. The experience of 20 years has taught the founders to work out many refinements of method in melting and heat treating, as well as in molding and finishing, but in the essentials of analysis and microstructure the steel is the same as always made.

The metal is distinctly an alloy steel, produced by melting the charge of pig iron and scrap in the cupola, blowing in the Bessemer converter and adding to the blown metal ferromanganese previously melted in crucible furnaces. Analyses must be frequently made of the cupola metal and blown metal and the raw material used, and every heat made must be carefully analyzed to insure the uniformity essential for high grade material. An average analysis of the steel would run: Carbon, 1.25 per cent.; silicon, 0.30 per cent.; manganese, 12.5 per cent.; sulphur, less than 0.02 per cent.; phosphorus, about 0.08 per cent.

### Exceptional Foundry Practice

On account of the powerful cleansing properties of ferromanganese the steel is singularly homogeneous and free from blow-holes, but the high manganese content increases the founder's difficulties in other ways. Shrinkage and contraction are excessive, requiring an allowance of  $\frac{5}{16}$  in. to the foot in patterns and necessitating a careful study of design so that the distribution of metal may be even throughout the casting. Compared with carbon steel practice the risers must be more numerous and more skillfully placed.

Ordinary molding sands and clay binders cannot be used for the molds. Only the purest silica sands will withstand the cutting of the metal. Dry sand molds are required for all castings, except those of the lightest weight and sections.

When the castings are taken from the molds in the untreated condition, they are glass hard and very brittle—so brittle that the risers and gates can be broken off. This is a fortunate circumstance, since otherwise they would have to be

turned off by a cutting flame or by grinding, which would entail considerable additional expense.

### Heat Treatment

The usual methods of annealing steel castings are worthless for manganese steel. By such means none of the brittleness can be removed. They must be carefully and gradually heated to the proper temperature, withdrawn from the furnace and quickly quenched in cold water. It will be seen that such drastic treatment of large and intricate castings, such for instance as an 8-ft. diameter impeller for a 20-in. centrifugal pump, makes it impossible to have poorly designed distribution of metal. All parts must cool at as nearly the same time as can be, or else with uneven contraction the castings will crack.

When properly heat treated, manganese steel is hard and tough. Chilled iron, while exceedingly hard, is brittle and comparatively weak. Hardened tool steel is stiff and easily broken under shock. But manganese steel, when correctly treated, combines toughness and hardness to a remarkable degree.

It is malleable to the extent that it can be drawn into wire, and it can be rolled and forged, although the processes are much slower than for ordinary steel, and great care must be taken in heating, otherwise the metal will disintegrate. The maximum thickness of metal which can be properly heat treated is  $3\frac{1}{2}$  in.

### Unusual Machining Methods

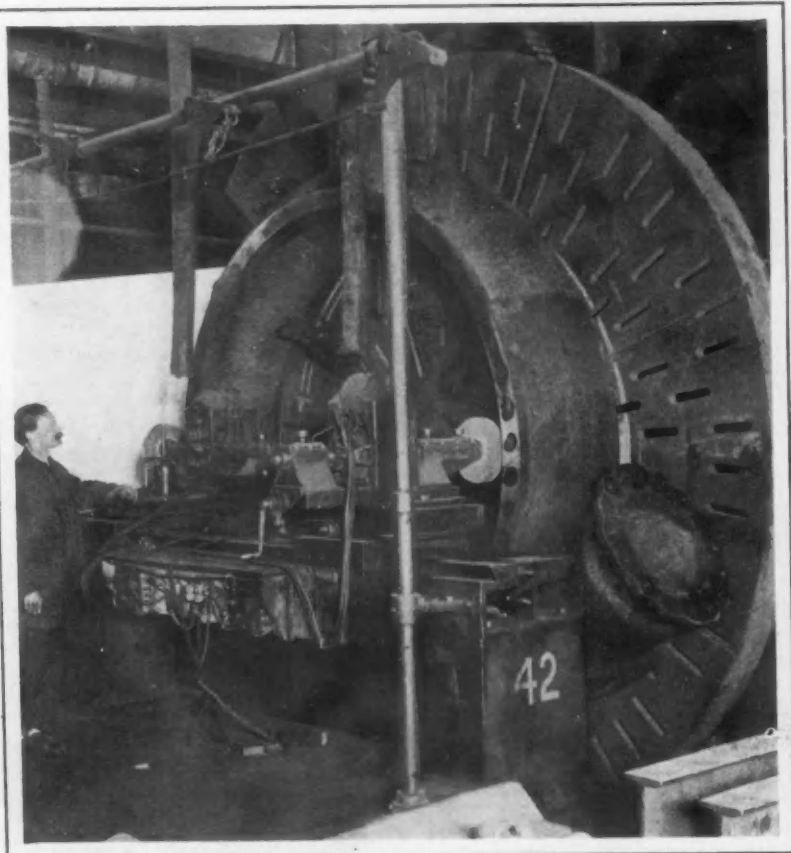
The combined properties of toughness and hardness make it commercially impossible to machine with cutting tools. Grinding must be resorted to for all operations. When necessary to drill and tap, soft steel or wrought iron inserts are set in the molds at the desired points and the metal cast around them. Inserts are also used where keyways are to be cut, and sometimes bushings are cast in the hubs of gears, wheels, etc., when it is desired to machine in the ordinary way.

The allowances for finish grinding are of course cut to a minimum, but on large diameters there is frequently  $\frac{3}{8}$  in. of metal on a side to be removed. The ordinary machinery designed for very light work is entirely inadequate and the founders have been obliged to work out and build their own machines suitable for the work. The accompanying

cut shows a double-ended face plate grinder, with three grinding heads [only two are shown] at work on a solid manganese steel casing for a 20-in. centrifugal pump. The casting weighs 16,500 lb. and the machine has a swing of 18 ft.

Manganese steel is non-magnetic, a property used to advantage in making the cover plates and casings for lifting magnets, which if made of brass or other non-magnetic metal soon wear out.

Manganese steel has played an important part in the engineering progress of the last two decades. With the increase of traffic and weight of rolling stock the railroads, both steam and electric, have found it almost obligatory to in-



Double-ended Face Plate Grinder at Work on a Manganese Steel Casing for Centrifugal Pump

\*Taylor - Wharton Iron & Steel Company.

steel special crossings, frogs, switches and curves of manganese steel. In the steel industry the castings are used in great number and variety from the mines and blast furnace to the finishing mills. The same is true of coal mining, rock crushing, cement making, gold dredging and general contracting work. Every gold dredge in California and Alaska uses manganese steel wearing parts. Every steam shovel working on the Isthmian Canal is equipped with manganese steel "Panama" teeth. The New York State Barge Canal is being excavated by shovels using these teeth, and by suction dredges equipped with pumps, either lined with manganese steel or made entirely of manganese steel castings.

In the past year it has been successfully demonstrated that pins of various shapes and sizes can be profitably die-forged from rolled manganese bar. The head can be square, T or hexagonal, and the end either round or flattened and punched for cotter pin. It has been shown that such pins are much more dependable than if made of any other material.

Mr. Stone's article referred to in the first paragraph may be summarized briefly by saying that manganese steel can be used to advantage where machine finishing is not intricate; where the cost of shut down for replacement means more than the first cost of repair parts, and where cast iron, malleable iron or ordinary steel breaks under shock or wears out quickly.

## Heavy Lake Traffic in Ore and Coal

### All Records to Be Broken—Cuyuna Manganiferous Ores and Newport Concentrates

DULUTH, MINN., March 15, 1913.—The large fleet of iron ore ships wintering at the head of Lake Superior is undergoing outfitting, and the expectation is that navigation will open about the middle of April. There is no great amount of ice on the lakes, and vessel men believe that the connecting channels will not delay an early opening. The season promises extreme activity. Few new ore carriers have been built in the winter, aside from three large ships for the United States Steel Corporation, and the tonnage to be moved will probably exceed, by a material amount, the 48,500,000 tons handled in 1912. The volume of coal to be carried into Lake Superior will also be far in excess of that of last year, which was about 12,000,000 tons.

### Remarkable Growth of Coal Traffic

Coal traffic to Lake Superior has doubled in the past three years, and is expected to double again in the next two or three. This growth is due to the construction of new railroads to Duluth and the Canadian head of the lakes and to revisions of tariffs on coal from Lake Michigan and Lake Superior, which causes have vastly widened the territory to be served by the Lake Superior region. Other reasons are the increase of population and business in the areas served from the head of the lakes, and the advantage to vessels of an up freight to Lake Superior, rather than to Lake Michigan. Much of the growth of this business on Lake Superior is at the expense of Chicago and Milwaukee, and this bids fair to be permanent. Additional coal companies are still coming in and great new docks are still planned for the future, suggesting that the business is far from its maximum. As indicating how it is growing, one concern can be cited, which three years ago began to receive coal at Duluth, last year brought up 800,000 tons and has contracted for vessels to bring 1,600,000 tons in 1913. Similar conditions exist at the Canadian ports of Port Arthur and Fort William, which now are the termini of three transcontinental lines of road.

### New Operations Include Pittsburgh Steel Company

Many new mines will be in operation this year, several on the Mesaba, several on the Cuyuna, and more on the Menominee, whose development in tonnage has been marvelous of late. The Steel Corporation is preparing for a greater business than ever from its Great Northern leases, and will make a record of shipments as a whole. For its Great Northern leasehold there remain now only this year and 1914, and its effort will be to conserve its other ores by taking as much as possible from these lands. It was impossible even last year for the Great Northern road to care for the ores delivered to it under this lease, and the same condition will probably be accentuated in 1913.

The Pittsburgh Steel Ore Company of Minnesota has taken a lease at 60 cents a ton on a Cuyuna range property lying close to Rabbit Lake, on which stripping by hydraulic means has been going on for some time. This is the second Cuyuna property to be stripped. A tremendous tonnage exists on this property, ranking it well up with the large mines of any American district, and it will provide the Pittsburgh Steel Company with ore for a very long period. Its ore is of a type somewhat similar to that of the Canisteo district, Mesaba range, in that concentration by washing will be undertaken there, in the expectation that a washed product of better than 60 per cent. can be secured for a part of the deposit.

### Manganiferous Ores from the Cuyuna

At the Pennington, which is the first Cuyuna stripping property, the lessee is the Tod-Stambaugh Company, of Cleveland, operating the Biwabik, of the Mesaba. About 100,000 yd. have been stripped since handling overburden began, some three months ago. Doubtless much ore will be taken from this mine the present season. Manganiferous ore shipments from the Cuyuna promise to be large, and the range will perhaps become the leading producer in this class of ores. As development progresses it becomes evident that ores carrying 25 to 30 per cent manganese and, say, 55 per cent. total iron and manganese will be shipped in considerable tonnage, and that a reasonably constant manganese content can be maintained. New development is increasing the area from which manganiferous ores can be mined.

On the Menominee the Chapin mine of the United States Steel Corporation is to have its Hamilton shaft lined with concrete from surface to the bottom, a depth of 1625 ft. The shaft is old and has been mined about in such a way that a considerable thickness of concrete will be needed in places. The mine is very wet and its pumps are now handling 3500 gal. per min. in an attempt to unwater a stream that was recently cut and which flowed at the rate of 7000 gal. In the new shaft there will be four electric pumps, each of 3000 gal. capacity, pumping in two lifts. In order to furnish power the company's big hydraulic plant at Quinnesec Falls will be changed to electric with steam auxiliaries. The electric plant will include two 2800 hp. turbines and two 1875 kw, three-phase, 60-cycle generators. Transmission will be at 13,200 volts to the mine, where it will be used at 2300. At the shaft there will be an auxiliary steam plant consisting of one steam turbine and a 2250 kw direct connected generator.

Some experiments have been made of late by the Newport Mining Company, Gogebic range, in the concentration of the footwall rock at the Newport mine. Several carloads of this material, carrying some 35 per cent. iron, were sent to Joplin and there treated in Woodbury jigs and over tables. A concentration to about 51 per cent. was made. There were considerable losses of iron in the tails, but it is believed by those in charge of the tests that success will be met with in the economical elimination of gangue by their processes. The flow sheet of this experiment is, roughly speaking, as follows: Breaking to 1.25 in. oversize to gyratory crusher, undersize and gyratory product to 3/4-in. trommel, material through trommel to Woodbury bull jig, undersize of trommel to three-compartment Woodbury jig. Tailings from the bull jig are recrushed and returned through the trommel, with the hutch products, while the concentrates go out as mineral. The compartment jig takes off a slime that goes to a settler, cone tank and a slime table; a concentrate product from compartments 1 and 2, and from 3 a trailings, a middlings that goes to a ball mill and is crushed for retreatment, and a hutch sand that goes to a table to be separated into tailings and mineral.

Woodbury jigs have now been tried out on Mesaba ores from the Sparta district, where the flow sheet has shown this movement: Broken to 1.25-in.; oversize to a picking belt producing iron ore and rock; undersize to a 0.25-in. trommel, the oversize of which goes off as product, and the undersize into a slime classifier, which makes a product of iron and slimes. These slimes go to a refuse trommel producing refined slimes and waste; the refined slimes go to a sloughing tank, the overflow of which is waste, and the bottom discharge goes to a settling tank producing a waste overflow and a still further reduced slime that passes to a slime table. The results of the first experiments here were not such as to lead to anything further immediately, though what may be the final result is not understood.



## Basic Open-Hearth Steel Castings\*

### Practical Methods of Manipulation to Get Satisfactory Results

BY H. F. MILLER, JR., VERONA, PA.

For some years the prejudice against basic open-hearth steel for casting has been gradually decreasing. Yet many consumers and engineers still cling to acid steel for castings, because of their alleged greater freedom from blow-holes and sponginess. Acid steel has been used for this purpose much longer than basic steel; and the melters in acid practice had it well in hand when basic steel was first tried. Then the necessity of learning a new set of laws for the production of satisfactory basic open-hearth steel for castings became evident.

The first of these laws, in my opinion, has to do with the furnace construction. The heat should be melted down as speedily as possible to prevent excessive oxidation. I have described† some furnaces designed by me, having as one of their features the promotion of quick melting.

#### Size of the Furnace

The hearth of the furnace is a decisive factor in the production of solid castings. The manufacturer should know the size of the heats he intends to make constantly, and should have his furnace built for that size of heat. The hearth should differ in dimensions from that of a furnace making ingot-steel. That is, the bath should be deeper and should have less surface-area. A shallow bath permits the slag to come out soon after the steel commences to flow, and thus prevents the additions from going into the steel, or from becoming uniformly distributed in case they have been put in hurriedly.

Under this head comes the very poor practice of making small heats in hearths of a much larger capacity. If into a 25- or 30-ton furnace only 12 or 15 tons of metal is charged per heat, the proportion of heats that will be wild or show signs of wildness at some time during the pouring will be comparatively large; whereas, when the hearth is charged to capacity, a heat showing signs of wildness will be a rare occurrence.

#### Influence of the Slag

The nature and action of the slag is an important factor in the manufacture of quiet steel. Slags are usually roughly classified by the melter according to physical appearance, as follows:

1. The "dry" heavy slag occurring when there is very little silica present. This is a dangerous slag if not carefully worked. The burning of many furnaces is due to reflection of the heat to the roof by this slag. Another danger is, that the melter, deceived by the physical appearance of the slag, may add an excessive amount of fluor-spar. This results in a badly-cut ladle and stopper-rod burned off. These disasters can be prevented by a gradual addition of spar until a wet slag is created, after which the heat may be worked down as usual. With natural gas the heat will foam for some time.

2. A "wet" but "lumpy" slag. This is a good slag to work with. The lumps of limestone should be broken up with a rod, so that a rocky bottom may be avoided. In some cases an unbroken lump will choke the tap-hole, so that the flow of the slag being stopped, the steel is left uncovered until the tap-hole can be freed. A large amount of heat is lost from the steel thereby. A lumpy slag can be avoided by charging small size limestone.

3. A third slag is the very watery variety, usually occurring when heats melt at high temperature, by reason of the presence of an excessive amount of silica. This slag should have burned dolomite or raw limestone added until a thick slag is made. When the slag is too thin, it will mix with the steel in tapping and a wild steel will be the product. The ladle and stopper-rod will be badly scorified, and usually some tons of steel will go into the pit by reason of a burned-off stopper-rod.

The ideal slag is heavy and wet with no large lumps. This slag makes an easy heat to work and gives a steel low in phosphorus and sulphur. It requires but a small

amount of fluor-spar to put this slag in shape for the ladle. A heavy slag of this nature will not mix with the steel, and will generally stay in the furnace until the steel is nearly all in the ladle. It also has the good quality of cutting neither the stopper-rod nor the ladle-brick. The only objection is that it causes a dirty bottom, and unless a "washout" is made after each heat the bottom will rise to the sill-plate level after a few heats. This result shows very poor practice. No time is ultimately gained by charging up without the usual "washout."

If a "washout" from 20 to 30 min. is made after each heat, the furnace will work fast for a much longer time. Moreover, the holes that occur in a "high" bottom will be largely avoided, if the bottom is kept low and clean.

#### The Tap-Hole and Spout

The tap-hole should be kept large and low. The quicker steel gets into the ladle, the more heat is retained. The shorter a spout, the better, for the same reason. Moreover, a large tap-hole will not clog up easily if rabbling has to be done; and few "hard" taps will occur. In shutting up the tap-hole magnesite is best, because it does not burn together, making a "hard" tap, nor does magnesite boil out, as may happen when a tap-hole is closed with green dolomite. Burned dolomite, however, may be safely used, the only draw-back being an occasional hard tap, due to the burning together of the material.

The foregoing facts are probably known to most smelters; but, unless vigilance is constant, one factor is apt to be overlooked. The bottom may be low, and the tap-hole all right; but the spout if not smooth at the end may cause the stream to spray over the ladle, thus losing much heat and causing a skull and, perhaps, some misrun castings, all of which could have been avoided if the spout had been made up carefully.

#### The Addition of Alloys

The addition of alloys may be made in the bath or in the ladle. By putting them into the bath, much heat is saved. This is a valuable method where a furnace is working cold or a heat has melted "low" and there is difficulty in getting it hot. The advantage is that the additions are made while the flame is still on the bath, and the loss of the heat in the bath caused by dissolving the alloys can be regained. The objections are: (1) that a large amount of each alloy must be added, since, in this way, from 15 to 30 per cent. goes into the slag; (2) that the silicon, reacting, will throw back the phosphorus into the steel.

Putting the additions into the steel as it goes into the ladle is in my opinion the better method. A uniform distribution of alloys is attained by shoveling the alloys in gradually. If the alloys are added in the ladle, the steel will be helped greatly by first raising them to red heat, especially in winter.

#### The Working of the Steel

After the heat has melted down and the limestone has boiled up, the charge will be benefited by allowing it to "soak" from 15 to 30 min. This will allow any contained slag to rise and also much of the gases. Ore may then be fed if necessary; or, if the heat has come "ready," it remains only to get the steel hot. Sometimes heats will melt low, and if one be hampered with small ladles, or have no heavy castings to pour, it is best to get the heat ready by using manganese. This will not add much metal to the bath, and it is a good substitute for pig-iron.

With large ladles, I would recommend working the heats with both pig-iron and manganese. Very little, if any, ferrosilicon should be used instead of manganese, since the silicon mixes with the slag and cuts the stopper-rod off while the heat is being poured. Hot metal is preferable to cold additions, as the bath is not then chilled by addition.

If the slag comes too quickly and all the additions have to be made to the first part of the heat, an even distribution can be obtained by rabbling the heat. If some of the additions are lost in the slag, or if not enough have been put in, the heat showing signs of wildness, a simple remedy is to take a number of sticks of aluminum, bend a tapping rod around them, thrust them to the bot-

\*Large part of a paper prepared for the February meeting of the American Institute of Mining Engineers.

†The Iron Age, June 27, 1912.

top of the ladle, stir the bath with them and rabble it afterwards if necessary. There is hardly a heat that cannot be made absolutely quiet by this means. But it is a curative treatment, and a good preventive is always better.

### The Time of Pouring

The time consumed in pouring is a factor in determining the size of the heat. Good practice demands that a heat of steel should be poured in less than 60 min. The faster the better. The high temperature required to pour steel from 1 to 2 hr. causes a great increase in occluded gases and necessitates an increase of about 30 per cent. of ferro-silicon to make it as quiet as when poured at lower temperature.

The use of fluor-spar seems also make the steel less responsive to the quieting action of silicon, since the fluorine seems to be absorbed by the steel. I have noticed when pouring a test that after much spar has been used, the steel gives off a smoky gas of the same appearance as when fluor-spar is added to the bath. If this is true the action of fluor-spar cannot be beneficial to steel when added in large quantities.

Good basic steel is harder to make than good acid steel. But if the practice outlined is followed, the steel produced will be as quiet while molten and as solid afterwards as acid open-hearth steel—and tougher.

## Producing Solid Steel Ingots\*

### Explanation of the Talbot Process with Its Analogy to Handling Paper Pulp

BY JOHN E. STEAD, MIDDLESBROUGH, ENGLAND

Dr. Howe long ago described what occurs when steel freezes in an ingot. In substance he stated that the crystallites, when the greater part of the metal has become solid, bridges across from the internal walls of the inside of the ingots as they slowly solidify, and that this mass sinks or sags downwards as the liquid in the central column of liquid contracts. I have proved repeatedly that that does occur.

The mass that sags must be free to flow as a whole. It could not sag if it were rigid. The bases of the fir-tree crystallites are rooted in the nearly solid walls and the branches are more or less interlocked. It is this which prevents them from falling to any great extent by gravity to the bottom of the liquid column. If, however, an ingot is very large and is cooled very slowly when the central column is still liquid it is almost certain that many of the fir-tree crystallites break away from the sides and fall to the lower part of the ingot. It is only on this hypothesis that one can explain how the steel in the lower central axis of large steel ingots is purer than the average. The greater quantity of the crystallites, however, do not fall, so the central mass, liquid and solid, sinks most freely in the center of the ingot, and the bridges of fir-tree crystallites form parabolic inverted domes.

A sulphur print was taken from the central axis of a 10-in. ingot made quite solid by aluminum. The wide end of the ingot mold was upward and the small end downward. The inverted domes could be traced from 6 in. from the top to 6 in. from the bottom of the ingot. It was cooled completely in air. The bridges were 2.5 to 3 in. across, about 30 per cent. of diameter.

### Passing the Plastic Center Ingot through Rolls

On passing the steel through the rolls in this condition the plastic mixture is forced up into the pipe, filling it completely. If the central column were nearly solid and had assumed a mass resembling felt saturated with liquid, only the residual liquid rich in sulphur and phosphorus and carbon would be squeezed out of the closely interwoven crystallites, and this liquid would fill the pipe and yield a mechanically produced segregate in the upper central axis. This kind of segregation is more common than generally known.

To conduct the process properly, the solidification must not be allowed to proceed until only a small portion remains liquid before pressing the ingot. When steel freezes it passes first to a mixture of part solid and still liquid which as a whole can itself flow under pressure just

as paper pulp flows in the paper mill, and, secondly, just like paper pulp when a great part of the liquid is removed from the fiber, it will not flow, but readily breaks up or tears if tension is applied; and lastly, when all the liquid is frozen, the whole mass becomes rigid and resembles finished paper from which the last portion of water has been removed.

It will be obvious then that in every ingot at one time during solidification there is a central column of substance like paper pulp that can flow, and that this is surrounded by an annular layer of steel almost completely solid incapable of flowing, but which readily breaks up on attempting to extend it, and which is, of course, most tender where it approaches the inside pulp, and strongest where it joins the annular layer of solid steel.

When an ingot in this physical condition is passed through the rolls, the outer solid layer will extend without breaking and the inner pulpy mass will flow, but the intermediate annular layer will fracture and form fissures only terminating when they reach the completely solid steel. The steel immediately in front of the fissures will contain a preponderating proportion of fir-tree crystallites and a small quantity of liquid rich in metalloids, and in this state resemble a felt filter.

When the fissures form under extension of the ingot in the rolls, the pulp inside the central axis will press against the felt-like filter and force the metalloid rich liquid forward into the fissures and this liquid will be followed by some of the liquid portion of the internal pulp, while the purer crystallites will be kept behind on the layer of the densely packed crystallites which constitute a real filter.

### The Showing of Sulphur Prints

The examination of several auto-sulphur prints of complete ingot sections and of blooms has shown that the crystallites in 10-in. ingots, even without cooling in the soaking pit, are sometimes 0.2 in. and more in length. The remarkable feature is that the crystallites in the central column are generally smaller than those in the intermediate layers between the outside and the center. One explanation for this is based on the assumption that the crystallites shoot continuously into the central column during the time the mold is not disturbed, and that the smaller crystals form when the ingot is removed from the pit and the liquid inside is more or less shaken.

A sulphur print was taken from a vertical section of a 10-in. ingot. The outside layer is 0.25 in. of very fine crystallization. The crystallites increase in length for about 2.5 to 3 in. The central axis is composed of about 5 in. of finer crystallites.

## Comparing the Motor Truck and the Horse

President George A. Kissel, Kissel Motor Car Company, Hartford, Wis., says:

"The time is nearly here when men will wonder why they ever indulged the fallacy of judging truck and horse from the same standard. The truck really occupies a new and distinct place in the transportation scheme. Besides doing all that the best horse ever could do, and doing it better, it accomplishes duty in interurban traffic never before performed by any agency. The business man who has not kept accurate track of his feeding, stabling, grooming, veterinary, blacksmithing, repairing, and the multitude of items in horse-up-keep will, if he is reasonable, look to the general and perfectly obvious service superiority of the truck. He will first take notice of the fact that truck users, almost without exception, never go back to horses; that they are perfectly content with its economies; that they dwell upon its capacity for continuous work, its immunity from disease and the severities of weather, its aptitude in meeting emergencies, its all around surpassing efficiency.

"It is a strange fact that the average business man cannot tell how much his horse haulage is costing him. Every other department of his establishment may have an approximately exact cost system, but when it comes to this relatively great question, he frankly admits that he does not know. Therein lies the truck salesman's greatest handicap. In advising the substitution of power wagons for horses, he knows that in most cases he is advocating a beneficial change, yet he is not often able to demonstrate his contention in figures that apply to the case in hand."

\*From a contribution to the American Institute of Mining Engineers.

## Blast-Furnace Slag-Analyses for 24 Hours\*

BY F. L. GRAMMER, LEESBURG, VA.

The analyses given in the accompanying table were made several years ago at my request at a plant using Lake ores. They are of two furnaces, one making basic, the other Bessemer pig iron. They gave six casts each in 24 hours, also two flushes of cinder between each cast. They are offered simply for the sake of reference as, so far as I know, it is unusual to find so frequent full analyses made and none on record.

The variations in manganese-content in the first and second flushes on the basic furnace are interesting, if no more than a freak—the first flush being invariably higher in manganese.

The iron-content of the two slags from an average of 12 flushes shows:

	Basic.	Bessemer.
Total iron, per cent.....	2.85	1.70
Combined iron, per cent.....	0.72	0.52
Free iron, per cent.....	2.13	1.18

The greater iron-loss in the basic slag, while known, has never heretofore been so clearly set forth. This may modify the arrangement for handling slag, heretofore

should be possible in slag granulation with a mag. than with molten slag and dumps. Additional arguments may be found from granulation at basic furnaces.

The analyses of the casts show that the furnace was in a healthy condition as regards regularity. I do not presume much buckshot was being made. It is, however, impossible for me to say, as it was not for this purpose these analyses were made. These data were brought out with the intention of publishing them without comment. The relation between the percentages of iron caused the digression.

## Steel Passenger Car Discussion

A meeting of the American Society of Mechanical Engineers will be held under the auspices of the Railway Committee on the evening of April 8, at the Engineering Societies Building, 29 West Thirty-ninth street, New York City, to discuss steel passenger car design. A number of engineers have consented to contribute 10-minute discussions on the phases of the subject in which they are particularly interested. The meeting will open at 8 o'clock sharp. The programme is as follows:

"Introduction to General Discussion of Steel Passenger Cars," H. H. Vaughan, assistant to the vice-president.

Comparative Record of a Day's Run of Furnaces on Basic and Bessemer Irons

									Basic Furnace				Bessemer Furnace																						
Tonnage on date of analyses, tons.....									512				520																						
Average for month, daily.....									475				587																						
Mesaba, per cent.....									81				69																						
Yield, per cent.....									51.9				51.0																						
Coke per ton.....									2,234				2,289																						
Stone per ton.....									1,002				1,271																						
Cu. ft. air per minute.....									35,000				37,500																						
Blast temperature, degrees F.....									900				900																						
Blast pressure, lb. per sq. in.....									19.5 to 21.5				17 to 20.5																						
Analyses of Iron, Each Cast.		Silicon		Sulphur		Mn.		P.		Analyses of Iron, Each Cast.		Silicon		Sulphur		Mn.		P.																	
		Per Cent.		Per Cent.		Per Cent.		Per Cent.				Per Cent.		Per Cent.		Per Cent.		Per Cent.																	
		0.84		0.047		.....		.....				1.10		0.035		.....		.....																	
		0.66		0.046		.....		.....				1.26		0.030		.....		.....																	
		1.00		0.040		0.94		0.238				1.17		0.034		0.46		0.097																	
		0.77		0.040		.....		.....				1.29		0.032		.....		.....																	
		0.73		0.050		.....		.....				0.82		0.028		.....		.....																	
		0.86		0.035		.....		.....		1.19		0.034		.....		.....																			
Analyses of Slag, Each Flush.		Comb. Fe.		MnO.		SiO <sub>2</sub> .		Al <sub>2</sub> O <sub>3</sub> .		CaO.		MgO.		S.		Total Fe.		Comb. Fe.		MnO.		SiO <sub>2</sub> .		Al <sub>2</sub> O <sub>3</sub> .		CaO.		MgO.		S.		Total Fe.			
		0.75		1.60		35.60		16.50		40.00		3.90		1.01		1.87				0.47		0.46		34.00		13.51		47.40		2.46		1.31		1.73	
		0.69		0.90		36.00		16.62		41.30		3.38		1.20		2.98				0.51		0.48		33.20		13.67		48.20		2.52		1.16		3.18	
		0.64		1.18		35.30		14.23		43.70		3.68		1.09		3.06				0.31		0.38		36.70		14.47		43.50		3.02		1.24		0.94	
		0.22		0.92		36.40		15.89		41.50		3.60		1.43		1.75				0.49		0.62		35.70		13.20		45.00		3.54		1.17		1.72	
		0.56		1.40		35.20		15.40		42.80		3.18		1.08		2.23				0.72		0.58		34.70		13.98		44.70		3.54		1.03		1.68	
		0.60		1.04		34.40		16.15		44.80		2.30		1.17		1.12				0.47		0.34		37.30		13.15		43.50		3.38		1.03		1.68	
		0.59		1.50		35.20		13.36		44.20		3.74		1.05		3.64				0.48		0.40		35.80		13.87		44.80		3.32		1.12		1.84	
		0.56		0.96		35.60		15.60		42.10		3.46		1.23		2.81				0.45		0.50		36.90		12.97		44.20		3.32		1.12		2.01	
		1.85		1.90		37.60		14.36		38.60		3.96		0.60		4.26				0.65		0.44		32.80		13.07		48.50		3.16		1.13		1.58	
		1.30		1.28		36.80		15.25		40.00		3.90		1.03		3.71				0.49		0.52		35.80		13.80		45.20		3.46		1.18		2.09	
		0.27		0.48		34.50		14.80		45.10		3.60		1.44		3.04				0.50		0.48		36.90		13.39		42.80		3.10		1.28		1.40	
		0.63		0.38		31.00		15.30		48.00		3.32		1.39		1.71				0.68		0.48		35.40		13.25		45.50		3.24		1.04		1.31	

Limestone analyses: SiO<sub>2</sub>, 4.07; Al<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub>, 1.50; lime, 47.87; magnesia, 3.42; phosphorus, 0.007.

usually determined by proximity of the dumping heap. If a nearby heap were available on contiguous territory, tilting molten-slag pots were used. If the Pittsburgh flood records for 30 years are a fair criterion, the government regulations were inadequate; molten slag was dumped in such a manner as to throttle the Monongahela at the time of the spring thaws.

At Pittsburgh the slag, where it is carried to a distance, is frequently granulated in pits and then removed in cars loaded by means of clam-shell buckets. This practice is quite customary where the slag is intended for the manufacture of slag cement. The production of 500 tons of cast iron daily means about 300 tons of slag and at 2.13 per cent., iron, equals 6.4 tons of free iron lost from the basic furnace daily, and about 3.5 tons from the Bessemer furnace, if these furnaces are representative.

Formerly considerable metal was brought in from the cinder dump, particularly from pots filled at the casting time from drainings of the skimmer and the trough. It seems to me that a nearer complete recovery of free iron

Canadian Pacific Railway; "Interior Steel Finish," Felex Koch, assistant mechanical engineer, Pressed Steel Car Company; "Roof Structures," C. A. Seley, mechanical engineer, Rock Island Lines; "Corrosion and Protection of Steel Passenger Cars," C. D. Young, engineer of tests, Pennsylvania Railroad; "Problem of Steel Car Design," W. F. Kiesel, Jr., assistant mechanical engineer, Pennsylvania Railroad; "Suspension of Steel Cars," E. W. Summers, president Summers Steel Car Company; "Truck for Steel Passenger Cars," J. A. Pilcher, mechanical engineer, Norfolk & Western; "Provision for Electric Lighting in Steel Cars," H. A. Currie, assistant electrical engineer, New York Central & Hudson River; "Provision for Electrical Equipment on Steel Motor Cars," F. W. Butt, assistant engineer, New York Central & Hudson River; "Special Ends for Steel Passenger Cars," H. M. Estabrook, president Barney & Smith Car Company; "Draft Gears for Steel Passenger Cars," S. P. Bush, Buckeye Steel Castings Company; "Cast Steel Double Body Bolster and End Frames for Steel Cars," C. T. Westlake, chief mechanical engineer, Commonwealth Steel Company.

\*Paper presented to the American Institute of Mining Engineers.



## Lackawanna Steel Company's Report

The Lackawanna Steel Company's annual report, giving the results of operations in the fiscal year ended December 31, 1912, enables the following comparison to be made with the income account for the preceding year, covering all subsidiaries:

	1912.	1911.
Gross sales and earnings.....	\$27,266,376.36	\$21,040,386.67
Less manufacturing and producing costs and operating expenses....	22,296,737.69	17,394,306.91
Total net income from manufacturing and operating.....	\$4,969,638.67	\$3,646,079.76
Dividends on investments in companies not controlled, net income from property rented, etc.....	707,305.45	526,637.31
Commercial discount and interest.....	36,463.57	58,276.29
Total income .....	\$5,713,407.69	\$4,230,993.36
Deduct administrative, selling and general expenses, including taxes..	807,965.06	739,514.91
Net earnings.....	\$4,905,442.63	\$3,491,478.45
Deduct interest on bonds and debentures:		
Lackawanna Steel Company....	1,749,958.32	1,750,000.00
Subsidiary companies.....	331,000.00	354,900.00
Rentals and royalties.....	101,890.15	101,536.00
Balance .....	\$2,722,594.16	\$1,285,042.45
Less appropriations:		
For sinking funds on bonds and exhaustion of minerals, including capital expenditure at mines written off .....	577,833.09	260,056.20
For depreciation and accruing renewals .....	1,135,949.63	942,183.18
Profit for the year .....	\$1,008,811.44	\$82,083.07
Surplus beginning of year.....	3,830,507.21	3,747,704.14
Net surplus December 31.....	\$4,839,318.65	\$3,830,507.21

The consolidated balance sheet as of December 31, 1912, is as follows:

Assets	
Cost of property, real estate, buildings, plant, machinery, etc.:	
As at December 31, 1911.....	\$65,187,132.39
Additions in 1912.....	1,121,181.59
	\$66,308,313.98
Investments in ore companies, etc.....	6,765,863.06
Cash in hands of trustees account of bond sinking fund .....	170,025.10
Stock of Lackawanna Steel Company in hands of trustees at par (deducted contra).....	250,000.00
Inventories .....	8,530,025.62
Miscellaneous accounts receivable.....	499,793.04
Customers' accounts (less reserve).....	5,666,681.31
Notes receivable .....	578,141.90
Cash in banks and on hand.....	3,846,555.04
Marketable stocks and bonds.....	990,356.26
Deferred charges .....	315,223.78
Total .....	\$93,670,979.09
Liabilities	
Common stock:	
Issued—349,780 shares .....	\$34,978,000.00
Less amount of stock in hands of trustees .....	250,000.00
	\$34,728,000.00
Capital stock of Lackawanna Iron & Steel Company and other subsidiary companies not held by Lackawanna Steel Company, 229 shares.....	22,900.00
Bonded debt, Lackawanna Steel Company.....	25,000,000.00
Subsidiary companies bonds.....	6,620,000.00
Five-year convertible debentures due 1915.....	9,999,000.00
Current accounts payable and payrolls.....	2,256,508.60
Bills payable .....	317,697.53
Taxes and interest accrued.....	631,994.88
Depreciation and replacement funds.....	5,687,692.89
Mines extinguished and bond sinking funds.....	3,236,481.39
Contingent and miscellaneous operating funds.....	331,385.15
Surplus:	
Balance December 31, 1911.....	\$3,830,507.21
Profits for year 1912.....	1,008,811.44
	4,839,318.65
Total .....	\$93,670,979.09

From President E. A. S. Clarke's statement to the stockholders the subjoined extracts are taken:

In the report sent you under date of March 13, 1912, it was stated that orders on hand had increased since January 1 of that year and the hope was expressed that, with the removal of existing political uncertainties, better prices would obtain and general business conditions be more satisfactory. The demand for the company's products increased rapidly after March 13, with a gradual increase in prices, so that operations during the second half of the year were more satisfactory, as evidenced by the shipments of the year and by the fact that the net profit for the whole year shows nearly 3 per cent. earned on the company's outstanding common stock, although the operations of the first half of the year showed a deficit, and the average price of \$27.72 per gross ton, received by the company for its products in 1912 is only five cents per ton greater than the corresponding price for 1911.

The company received during 1912, from mines which it owns, or is interested in, and from other sources 1,851,562 gross tons of iron ore and produced a total of 1,040,436 gross tons of coke and 1,009,253 gross tons of pig iron. It also produced 502,981 gross tons Bessemer ingots and 555,129 gross tons of open-hearth ingots, a total of 1,058,110 gross tons of steel ingots of all kinds.

Shipments of products were as follows, all in gross tons, the figures for four preceding years being given for comparison:

	1912.	1911.	1910.	1909.	1908.
Standard rails.....	303,100	225,699	363,577	278,885	190,763
Light rails.....	14,499	18,521	26,288	33,787	20,253
Angle bars, fittings, etc.	68,782	35,424	60,071	43,901	16,719
Structural shapes.....	116,201	116,581	146,641	138,021	72,816
Plates .....	64,570	52,756	87,469	60,953	33,832
Merchant steel products	148,454	77,010	67,150	41,607	17,921
Sheet bars, slabs, billets and blooms .....	99,445	92,967	159,761	201,455	104,108
Pig iron and miscellaneous .....	168,495	141,405	171,558	115,044	20,438
Total .....	983,546	760,363	1,082,515	913,653	476,850

Attention is called to the very considerable increase in shipments of merchant steel products, confirming the judgment of the directors in choosing this particular line when planning for greater diversification of the company's products.

The two 60-ton open-hearth furnaces which were authorized by the directors in the latter part of 1911 became operative in the third quarter of 1912 and the hot metal mixer in the open-hearth department was put in operation in the last quarter of 1912. Further additions to the open-hearth ingot capacity, estimated to increase it approximately two-thirds, were authorized by the directors in 1912. About one-half of this additional capacity is expected to become operative in the second quarter and the balance in the third and fourth quarters of 1913. The directors also authorized during 1912 the construction of a spike and bolt factory, which is expected to become operative in the second quarter of 1913, providing a further diversification of the company's products.

During the year \$438,000 face value of bonds of subsidiary companies were redeemed and canceled.

The company's working capital, as represented by the surplus of current assets over current liabilities, has increased \$797,569.03 and amounts to \$16,905,352.16. Attention is called to the reduction in inventory of \$1,448,692.60, to the increase in sinking and reserve funds of \$1,585,395.96, and to the increase in surplus of \$1,008,811.44. During 1912 the directors authorized the purchase in the market of \$1,000,000 face value of the company's five-year convertible debentures, which mature March 1, 1915, and these are now held in our treasury. Cash on hand and in banks amounts to \$3,846,555.04.

Orders on hand are sufficient to keep the works fully employed through the third quarter of the current year, and the outlook is favorable for the remainder of the year.

## Hyatt Roller Bearing Data

The March number of the Hyatt Way, a monthly published in the interest of anti-friction bearings by the Hyatt Roller Bearing Company, Newark, N. J., marks a change in the appearance and policy of this house organ. The booklet is an evolution from the time when the company started to advertise its products and issued regularly reprints of the advertisements appearing during the previous month to all its salesmen and agents. These advertisements were reproduced full size, and the booklet was rather large to handle conveniently. This gave way to the present standard, 6 x 9 in., which presents reduced reproductions of the advertisements.

When the company entered the mine car field, it made arrangements with prominent manufacturers to sell its bearings in their wheels, the housing design being approved in each instance by the Hyatt engineering department. At the present time, there are 14 such manufacturers, and beginning with the March issue the Hyatt Way will consist of a series of special numbers, each dealing with some one manufacturer and his product. This number is devoted to the Truax Mfg. Company, Denver, Col., and shows the company's Leadville tram car, the Truax-Hyatt wheel and a shipment of 500 Truax-Hyatt bearings, as well as a photograph of the building occupied by this company. Brief descriptions of the tram car and the wheel are also included.

## Report of La Belle Iron Works

From the annual report of the La Belle Iron Works, Steubenville, Ohio, the following statement of the income account for the 12 months ended December 31, 1912, is taken, compared with the figures for the previous 12 months:

	1912.	1911.
Net earnings from operations, after deducting charges for maintenance and repairs (approximately \$608,000 in 1912 and \$680,850 in 1911).....	\$1,249,502.58	\$1,460,513.20
Less provision for exhaustion of minerals and extinguishment of lease values .....	71,522.05	36,405.40
Profits for the year.....	\$1,177,980.53	\$1,424,107.80
Deduct:		
Interest on bonds.....	122,715.00	131,955.00
Cash dividends on stock.....	991,530.00	991,515.00
Balance .....	\$63,735.53	\$300,637.80
Surplus arising from appreciation in value of ore lands.....	10,000,000.00	
Less stock dividend of 100 per cent..	9,915,400.00	
Surplus for the year.....	\$148,335.53	\$300,637.80
Surplus at beginning of year.....	2,825,212.99	2,950,569.80
Total surplus .....	\$2,973,548.52	\$3,251,207.60
Deduct:		
Appropriation for depreciation.....		250,000.00
Surplus December 31.....	\$2,973,548.52	\$3,001,207.60

A special statement for the six months ended December 31, 1911, shows a deficit of \$175,994.61 for that period, after the payment of dividends.

The balance sheet now shows \$9,915,400 common stock and \$9,915,400 preferred stock issued, with \$1,966,000 first mortgage 6 per cent. bonds outstanding. Quick assets are \$5,701,135.30, including \$965,460.10 in cash, with but \$744,312.66 current liabilities. Reserves for general depreciation, exhaustion of minerals, relining of furnaces, etc., are \$2,041,538.50.

From the accompanying statement of President W. D. Crawford, referring to the operations for 18 months, from the close of the company's former fiscal year ended June 30, 1911, the following extracts are taken:

The company's ore properties were operated on a basis sufficient to supply the ore required by the Steubenville furnaces, the total production for 18 months being 586,421 gross tons, or an increase of 55 per cent. per annum over the fiscal year ended June 30, 1911.

On account of the low prices of coke, the company's properties were not operated in the last six months of 1911. However, changes in market conditions made it advantageous to operate all of the ovens throughout 1912, during which there was produced 100,659 net tons of coke.

The demand for the company's products was such that during the last six months of 1911 production was on the basis of approximately 50 per cent. while in the year 1912, owing to an increased demand, the plants were operated at approximately 85 per cent. of capacity, and during the last four months to the maximum of capacity, the comparison being as follows:

	Production. Gross tons.	Increase for 12 mo of 1912 over fiscal year ended June 30, 1911. Per cent.
Pig iron:		
Last half 1911.....	69,762	
Year 1912.....	263,867	16
Billets and slabs:		
Last half 1911.....	103,209	
Year 1912.....	322,603	22
Finished goods:		
Last half 1911.....	148,259	

The average number of workmen employed during the 18 months was approximately 3600, the pay roll for this period aggregating \$4,586,758.13.

The aggregate value of shipments for the last half of 1911 was \$4,407,256.82; for the year 1912, \$12,238,366.87, the latter being an increase of 18 per cent. over the fiscal year ending June 30, 1911.

The oil production for the 18 months was 17,670 bbl., as against 15,600 bbl. for the fiscal year ended June 30, 1911, the output at the present time being about 725 bbl. per month.

In view of the fact that there has been appropriated for various reserve accounts the sum of \$2,041,538.50, the board of directors deems it unnecessary at this time to make any further provision for general depreciation.

There was paid during the 18 months in cash dividends the sum of \$1,487,295, being at the rate of 10 per cent. per annum on the outstanding capital stock until

October 15, 1912, and at the rate of 8 per cent. per annum on the preferred and 2 per cent. per annum on the common capital stock since the date mentioned. In addition to the cash dividends, a stock dividend of 100 per cent., or \$9,915,400, was paid October 15, 1912.

The unsatisfactory condition of business existing at the time of our last report continued throughout the first nine months of the period under review, with the further handicap that prices were lowered nearly every succeeding month, until the average per ton value of shipments was less than at any time in the history of the company. Beginning with the second quarter of 1912, the demand for all kinds of steel articles became more active, with the result that prices commenced to advance, and since then business has been in a healthy condition and better average prices obtained with each new month.

Underlying conditions at the moment are sound and the company has sufficient tonnage booked to operate its manufacturing plants in full into the third quarter of 1913. A prophesy for the future beyond this period would be difficult to make.

## Joint Meeting on Industrial Illumination

The illumination of industrial plants was the subject discussed at the joint meeting of the American Society of Mechanical Engineers, the Society of Illuminating Engineers, the American Museum of Safety and the Sage Foundation for the Prevention of Blindness, held at the Engineering Societies Building, 29 West Thirty-ninth street, New York City, on the evening of March 13. This subject was discussed from the standpoint of the physician and the illuminating, mechanical and safety engineers. The first paper on "Illumination and Eye Strain" was presented by Ellice M. Alger, M. D., professor of diseases of the eye, New York Post-Graduate Medical School, for the Sage Foundation. After discussing the effect of various kinds of illumination upon the eye, the fact that retinal anesthesia and the deep shadows that result from poor artificial lighting are potent factors in causing industrial accidents was brought out. The increase in the number of accidents during the dark winter months was commented upon as well as the fact that indoor workers often suffer accidents from too much light as well as from too little. The physical effects of over lighting and bad lighting were touched upon and the point of faulty arrangement of machinery was also mentioned.

The second paper dealing with industrial lighting from the illuminating engineer's standpoint was presented by Ward Harrison, of the Engineering Department of the National Electric Lamp Association. This speaker considered illumination from the standpoint of the return on the money invested. While the cost must, of course, be considered in planning any lighting system, consideration was also due to employees. Emphasis was laid upon the fact that good lighting did away with the necessity of breaking in new employees frequently to replace those whose eyes had become defective and also reduced accidents. Another result of good lighting was the better output which was secured. The three points to be considered in planning an illuminating system were light upon the work, sufficient light to dispel the surrounding gloom and the avoidance of glare in the eyes of the worker.

A. C. Jackson, general superintendent, treasurer and secretary of the Miller Lock Company, Tacony, Philadelphia, Pa., discussed the illuminating engineering problem from the mechanical engineer's standpoint. Among the points brought out by this speaker were that good illumination had more to do with efficiency than it generally received credit for. In his opinion, more money was wasted by the improper location of machinery and benches than by the provision of ample lighting facilities. In planning a shop he stated that the ceiling should be white-washed to reflect the light back into the room and that the benches and machines should be placed so as to avoid direct light and shadows.

The fourth paper, by Dr. W. H. Tolman, director of the American Museum of Safety, dealt with the prevention of industrial accidents by good illumination. All of the papers were supplemented by lantern slides, showing examples of good and bad lighting, and in the case of Mr. Harrison's paper, typical lighting layouts in industrial establishments and test results were also shown.

### The American Radiator Company's Year

From the fourteenth annual report of the American Radiator Company the following income account for the fiscal year ended January 31, 1913, as compared with the preceding year, is taken:

	1912-13	1911-12
Net profits.....	\$1,696,193	\$1,312,052
Preferred dividends.....	210,000	210,000
Balance.....	\$1,486,193	\$1,102,052
Common dividends.....	1,266,900*	615,000
Surplus.....	\$219,293	\$487,052
Previous surplus.....	6,007,220	5,520,168
Total surplus.....	\$6,226,513	\$6,007,220

\*Cash, \$651,900; stock, \$615,000.

Net quick assets January 31, 1913, were \$6,037,629, including \$2,563,677.89 in cash.

From the accompanying comments of President Clarence M. Woolley the following extracts are taken:

The sales results during the earlier months of last year were normal, but as the general trade conditions of the country improved, a generous increase in the volume of business was secured. The selling organization in conjunction with an extensive system of advertising, which gives the broadest publicity to the economic and sanitary advantages of modern methods of heating for new and old buildings, induced a demand exceeding that of any other year.

Following the commercial depression which began with the panic of 1893, the company, actuated by a desire to keep its factories in operation, investigated the opportunity for establishing our line of industry abroad, where, up to that time cast-iron radiators and boilers had not been employed. Representatives were sent to Europe for that purpose. An extensive field was disclosed and a market promptly created for these products. Later on and from time to time as the volume expanded, in order to retain and still further increase this business, it was found necessary to give quicker service than it was possible to render from points of production over seas, and companies were gradually organized and factories built in France, Germany, England, Italy, Austria and Canada.

The earnings of these foreign companies have been substantial, but no dividends have been declared, the profits having been employed in the necessary development of their business. For this reason such income has not been included in the balance sheets of this company. The aggregate earnings of these foreign companies from their inception to February 1, 1913, were \$5,016,704.10, which amount represents their surplus. The growth of the business and the increase in net profits abroad continue at a satisfactory rate, notwithstanding the fact that our success has induced foreign capital to enter the field with enterprising competitive institutions.

The net profits resulting from the sales in the United States for the fiscal year just closed were \$1,696,193.19 after all charges for reserves and depreciation were deducted. The aggregate profits of the foreign companies for the same period were \$1,005,954.42. The aggregate profits at home and abroad were \$2,702,147.61.

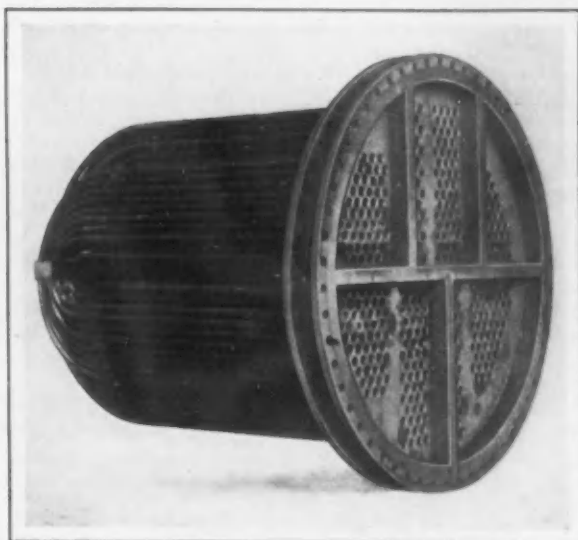
### Exchanging Apprentices Among Works

An interesting practice has been entered on by the Maschinenfabrik Augsburg-Nürnberg and the Ludwig Loewe & Co. Aktien Gesellschaft under which an apprentice, after the completion of his period of training in the one shop and expressing a desire to travel, is taken in by the other concern. The plan, according to Werkstattstechnik, is a recognition of the desire which the young man develops to see the world, sometimes to get away from the home atmosphere, and in recognition, also, of the fact that, by traveling, the apprentice gains a breadth of view not otherwise possible, including notions of new processes and methods of working. It is felt that when he comes back to the plant where he took his apprenticeship, he is really more useful than before. While absent he is expected to write at definite intervals, say, three months, about his work, and he thus retains a cordial relation with his first employer so that he feels that a position is practically waiting for him.

### A Large Hot Water Heater

What is believed to be the largest hot water heater ever built was recently constructed by the National Pipe Bending Company, New Haven, Conn., for the Wood Worsted Mills at Lawrence, Mass. This heater which is of the U-bend type has a capacity of 125,000 lb. of water per hour, heating it from 100 to 212 deg. F. by exhaust steam. It rests horizontally on cradles and is almost 9 ft. long. It measures 5½ ft. in diameter and contains 212 1¼-in. brass tubes expanded into a header. The arrangement of the tubing, headers and baffles is shown herewith.

An 8-in. inlet in the front of the heater admits the water which flows through a bank of tubes extending



View Showing the Arrangement of the Tubing, Header and Baffles in a Large Hot Water Heater Built by the National Pipe Bending Company

from the front to the rear. The water makes four passes in all before leaving the heater through an outlet of the same diameter as the inlet, which is also located at the front of the heater. Baffles on the header force the water to travel through the tubes and divide the space horizontally into two main sections while others divide the upper section into three parts and the lower into two, the arrangement of these baffles being clearly shown in the accompanying engraving.

The steam enters at the top through a 10-in. inlet and entirely surrounds the tubes, the water of condensation leaving the heater through a 4-in. drain at the bottom. As all the tubes are of brass, it is emphasized that there is no action on the water, thus making it suitable for washing or boiler feed purposes. Corrosion of the steel plate shell is avoided by the design which keeps the water from coming in contact with the shell.

If desired, it is possible to use this heater as a storage heater by reversing the action. When employed for this purpose the steam is directed through the tubes which are then surrounded with water. Although it is possible by this arrangement to secure a larger quantity of water, at the same time its temperature is lower.

The Mead-Morrison Mfg. Company, Boston, Mass., has perfected plans for the erection of large works for the manufacture of coal handling machinery and steam and electric hoists on a site recently acquired at East Boston. The plant will consist of a plate shop, erecting shop, machine shop, power plant, pattern shop, foundries and general offices. Contracts have been awarded to the McClintic-Marshall Construction Company, Pittsburgh, Pa., for the machine and erecting shops, to the Levering & Garrigues Company, New York, for the plate shop, and to the New England Foundation Company for the foundations. The shops will be equipped with four 10 and one 25-ton cranes, which will be furnished by the Shaw Electric Company. The company is controlled by the same people who established the business, the officers being Eugene Foss, president; Willard S. Martin, vice-president and general manager; J. G. Morrison, treasurer, and Burton L. Gale, assistant treasurer.



## British Foreign Trade in Iron and Steel

### Statistics for Ten Years Show Slow Gains in Exports While Imports Are Mounting

Howard H. Cook, assistant secretary of the American Iron and Steel Institute, has an article in the February issue of the Bulletin of the Institute on "Iron and Steel in the Foreign Trade of Great Britain." He refers to the rapid increase in the iron and steel foreign trade of the United States and Germany in recent years and contrasts the slow growth of the like trade of Great Britain. Below are given the tonnage and value of British iron and steel exports and imports for the 10 years ending with 1912. Scrap is included, but not iron ore, ships, machinery, cutlery, hardware, implements, tools and instruments. Imports are c.i.f. to place of landing and exports f.o.b. place of shipment:

The total exported in the 10 years, 1903 to 1912, amounted to 44,114,228 gross tons, ranging from 3,426,238 tons in 1904 to 5,311,993 tons in 1907. Exports were heavy in 1906 and 1907 and it was not until 1912 that the record of 1906 was surpassed, while that of 1907 has not since been equaled. The annual average tonnage of exports for the first five years was 4,234,935 tons, for the last five years, 4,587,910 tons, an increase of 8.3 per cent.

The total value of the exports amounted to \$1,906,766,753, ranging from \$138,750,259 in 1904 to \$238,271,818 in 1912. The average value per ton for the first five years was \$41.13; for the last five years \$45.11. This increase was due to a considerable extent to an increase in the exportation of the more highly finished products.

The imports for the 10 years amounted to 13,906,706 tons, ranging from 962,727 tons in 1907 to 2,062,625 tons

sheets. Particular interest attaches to tin plates, as they are not separately stated. Apparently they are included in "plates and sheets." The statement is made that galvanized sheets and tin plates together make up one-fifth of the total tonnage and three-tenths of the total value of all iron and steel products. The most rapid growth is shown by wrought pipe and tubes. In the first five years their total was 470,556 tons; in the second five years, 786,852 tons.

### Mechanical Engineers' Baltimore Meeting

Three professional sessions have been planned for the Baltimore meeting of the American Society of Mechanical Engineers to be held May 20 to 23 at the Hotel Belvedere, Baltimore. The meeting is to be opened with an informal reception on Tuesday evening, May 20, and on Wednesday morning there will be two sessions held simultaneously and on Thursday morning the third session, leaving Wednesday and Thursday afternoons for excursions, and the entire day of Friday for a trip to Annapolis. Wednesday evening is to be devoted to a lecture, though the speaker and subject have not yet been announced, and a reception and banquet is to be held on Thursday evening.

One of the Wednesday morning professional sessions is to receive papers on phases of the patent situation and on the performance of automobile trucks. The other session of that morning is a meeting of the gas power section at which two papers are promised, one on oil engine practice and one on blast furnace gas. Thursday morning is to be given up to the subject of fire protection, including a discussion of the high-pressure fire-fighting system at Balti-

Table I.—British Exports and Imports of Iron and Steel Products

Year	Exports			Imports		
	Gross tons	Values	Value per ton	Gross tons	Values	Value per ton
1903	3,706,263	\$149,889,053	\$40.44	1,320,588	\$42,345,802	\$32.06
1904	3,426,238	138,750,259	40.50	1,311,008	40,228,762	30.68
1905	3,870,442	156,880,781	40.53	1,379,196	42,094,919	30.52
1906	4,859,740	196,428,447	40.42	1,251,715	41,156,477	32.88
1907	5,311,993	228,959,684	43.10	962,727	35,470,832	36.84
Total, 5 yrs.	21,174,676	\$870,908,224	\$41.13	6,225,234	\$201,296,792	\$32.33
1908	4,229,508	\$183,754,778	\$43.45	1,143,672	\$37,643,412	\$32.91
1909	4,373,381	188,031,067	42.99	1,226,426	39,178,234	31.95
1910	4,735,734	211,123,673	44.58	1,436,410	45,153,298	31.43
1911	4,661,330	214,677,193	46.05	1,812,339	54,856,900	30.27
1912	4,939,599	238,271,818	48.24	2,062,625	63,967,893	31.01
Total, 5 yrs.	22,939,552	\$1,035,858,529	\$45.11	7,681,472	\$240,799,737	\$31.35
Grand Total	44,114,228	\$1,906,766,753	\$43.22	13,906,706	\$442,096,529	\$31.79

in 1912. Remaining practically stationary down to 1910, they have increased rapidly in the last two years, a condition which has caused much comment in England. The annual average of imports for the first five years was 1,245,047 tons; for the last five years 1,536,294 tons, an increase of 23.4 per cent.

The total value of the imports amounted to \$442,096,529, ranging from \$35,470,832 in 1907 to \$63,967,893 in 1912. The average value per ton for the first five years was \$32.33; for the last five years, \$31.35.

### Exports and Imports by Main Classes

Iron and steel products may be divided into three main classes, based on the stage reached in process of manufacture: 1. Pig-iron and scrap. 2. Semi-finished products intended for further elaboration, including ingots, billets, slabs, sheet and tin bars and muck bar. 3. Finished products, including finished rolled products and manufactures.

Classifying the exports and imports in this way reveals at once an important difference in their character. The exports consist almost exclusively of the first and third classes; that is, of pig-iron and finished products. The imports, on the other hand, show a large proportion of semi-finished products:

	Exports		Imports	
	Gross tons	Per cent	Gross tons	Per cent
Pig-iron and scrap	14,072,025	31.9	1,686,040	12.1
Semi-finished products	97,320	2.2	5,603,485	40.3
Finished products	29,944,883	67.9	6,617,181	47.6
Total	44,114,228	100.0	13,906,706	100.0

The author gives a table classifying the exports by groups of products. A comparison of the totals for the first five years with those for the last five years shows a decline in pig-iron and scrap and in railroad material. All other groups show an increase. One group is plates and

more, and the question of standard couplings for fire apparatus. In connection with the meeting, there is to be a demonstration of the high-pressure fire system in the afternoon.

As one of the features of the Annapolis trip, which will include a steamboat excursion from Baltimore to Annapolis, is announced an address at the Maryland capitol, by Admiral H. I. Cone, engineering chief of the Bureau of Steam Engineering, U. S. N., on the United States experimental station at Annapolis. It is understood, also, that there are to be hydro-aeroplane flights by officers and men of the aviation school, and possibly evolutions of submarine boats.

### A Linde Oxygen Plant at Cleveland

The Linde Air Products Company, an Ohio corporation, has purchased a site at East Seventy-second street and the Lake Shore Railroad in Cleveland, where it plans to begin shortly the erection of a plant on which about \$150,000 will be spent for buildings and equipment. The company will manufacture oxygen in tanks for use in cutting and welding by the iron and steel trade. The parent organization bearing the same name has headquarters at 79 Wall street, New York, with several plants now in operation in various cities and others under construction. It is stated that in addition to the Cleveland plant new factories will be built this year in Boston, St. Louis and Atlanta. Cleveland is largely represented in the parent company, which is capitalized at \$5,000,000. G. W. Mead is president; G. M. Godley, vice-president and M. E. Johnston, secretary-treasurer, all of New York. The directors are the officers and C. F. Brush, John L. Severance, H. K. Devereux and E. D. Burke, Jr., of Cleveland and Hugo Reisinger of New York.

# United States Steel Corporation's 1912 Report

Gross Receipts, \$745,505,515.48. Increase on Previous Year, \$130,356,675.69, or 21 Per Cent. Net Earnings, \$108,174,673.12. Increase on Previous Year, \$3,869,207.25, or 3½ Per Cent.

The eleventh annual report of the United States Steel Corporation, which gives the result of operations in the year ended December 31, 1912, shows an increase in gross sales and earnings of \$130,356,675.69, or 21 per cent., as compared with 1911. The net earnings increased but \$3,869,207.25, or 3 2/3 per cent. The report, which covers operating results of all the subsidiaries, enables the following comparison of the financial outcome of the year:

## Income and Surplus

	1912.	1911.
Gross receipts, sales and earnings...	\$745,505,515.48	\$615,148,839.79
Manufacturing cost and ordinary maintenance .....	\$609,420,249.50	\$488,134,474.11
Administrative and general expenses .....	17,760,567.15	16,554,152.67
Taxes .....	9,840,371.12	9,622,347.23
Discounts and interest .....	3,941,298.52	3,378,133.86
Balance .....	\$104,543,029.19	\$97,459,731.92
Sundry manufacturing and operating revenues and rentals .....	3,344,564.41	937,650.75
Income from investments, etc. ....	3,001,787.06	2,804,938.96
Total income .....	\$110,889,380.66	\$101,222,321.63
Interest charges subsidiary companies .....	9,751,728.99	8,037,695.19
Balance .....	\$101,137,651.76	\$93,184,626.44
Net balance profits earned by subsidiary companies .....	7,037,021.36	11,120,839.43
<b>Net earnings .....</b>	<b>\$108,174,673.12</b>	<b>\$104,305,465.87</b>
Depreciation funds, etc. ....	\$22,734,365.82	\$19,839,098.75
Balance .....	\$85,440,307.30	\$84,466,367.12
Bond interest and sinking fund .....	31,182,560.37	29,247,850.00
Balance .....	\$54,257,746.93	\$55,218,517.12
Sundry credit adjustments .....	-17,697.56	+81,779.66
Total available for dividends, etc. ....	\$54,240,049.37	\$55,300,296.78
Preferred dividends paid .....	25,219,677.00	25,219,677.00
Common dividends paid .....	25,415,125.00	25,415,125.00
Balance, surplus .....	\$3,605,247.37	\$4,665,494.78

The total undivided surplus at the close of 1912 is placed at \$136,716,245.27, exclusive of profits earned by subsidiary companies on inter-company sales of products on hand in inventories.

## Condensed Balance Sheet

Following is a condensation of the general balance sheet as of December 31, 1912:

Assets	
Property account .....	\$1,448,175,254.82
Deferred charges .....	7,149,672.74
Investments .....	3,729,455.60
Sinking and reserve fund assets .....	18,669,884.24
Inventories .....	152,412,253.58
Accounts receivable .....	68,574,839.08
Bills receivable .....	6,895,568.92
Agents' balances .....	903,195.37
Marketable bonds and stocks .....	1,836,429.29
Cash .....	67,153,564.42
<b>Total .....</b>	<b>\$1,775,500,109.06</b>
Liabilities	
Common stock .....	\$508,302,500.00
Preferred stock .....	360,281,100.00
Outstanding stock of subsidiary companies .....	591,542.50
Bonded and debenture debt .....	643,129,931.53
Mortgages and purchase money obligations subsidiary companies .....	817,249.12
Accounts payable and payrolls .....	31,578,306.13
Bills payable .....	14,295.75
Special deposits or loans due employees and others .....	902,810.37
Accrued taxes not yet due .....	6,767,095.44
Accrued interest and unrepresented coupons .....	8,489,659.53
Preferred dividend, payable February 27, 1913 .....	6,304,919.25
Common dividend, payable March 29, 1913 .....	6,353,781.25
Sundry reserve funds .....	25,250,672.92
Appropriations for capital expenditures .....	40,000,000.00
Surplus, exclusive of profits earned by subsidiary companies on inter-company sales of products on hand in inventories .....	136,716,245.27
<b>Total .....</b>	<b>\$1,775,500,109.06</b>

## Production

The production of the subsidiary companies for the year 1912 compared with the year 1911 was as follows:

Product.	1912. Tons.	1911. Tons.
Iron ore mined:		
In the Lake Superior ore region:		
Marquette Range .....	551,575	560,685
Menominee Range .....	995,401	1,105,044
Gogebic Range .....	1,497,950	1,264,734
Vermilion Range .....	1,301,663	1,182,075
Mesaba Range .....	20,001,953	14,581,530
In the Southern ore region:		
Tennessee Coal, Iron & Railroad Co.'s mines .....	2,079,907	1,239,563
<b>Total .....</b>	<b>26,428,449</b>	<b>19,933,631</b>
Coke manufactured:		
In beehive ovens .....	11,554,840	9,491,206
In by-product ovens .....	5,164,347	2,629,006
<b>Total .....</b>	<b>16,719,387</b>	<b>12,120,212</b>
Coal mined, not including that used in making coke .....	5,905,153	5,290,671
Limestone quarried .....	6,124,541	4,835,703
Blast furnace production:		
Pig iron .....	13,990,329	10,593,726
Spiegel .....	53,829	66,435
Ferromanganese and ferrosilicon .....	142,006	84,736
<b>Total .....</b>	<b>14,186,164</b>	<b>10,744,897</b>
Steel ingot production:		
Bessemer ingots .....	6,643,147	5,055,696
Open-hearth ingots .....	10,258,076	7,697,674
<b>Total .....</b>	<b>16,901,223</b>	<b>12,753,370</b>
Rolled and other finished steel products for sale:		
Steel rails (heavy and light tee and girder) .....	1,857,407	1,568,028
Blooms, billets, slabs, sheet and tinplate bars .....	1,103,752	874,474
Plates .....	1,076,308	630,512
Heavy structural shapes .....	898,537	547,186
Merchant steel bars, hoops, bands, skelp, etc. ....	1,910,512	1,221,606
Tubing and pipe .....	1,111,138	863,670
Wire rods .....	196,720	118,302
Wire and products of wire .....	1,629,717	1,613,754
Sheets (black and galvanized) and tinplate	1,508,607	1,079,046
Finished structural work .....	599,301	518,399
Angle splice bars and all other rail joints	192,488	160,855
Spikes, bolts, nuts and rivets .....	83,426	60,386
Axles .....	142,367	52,046
Steel car wheels .....	65,931	36,652
Sundry steel and iron products .....	130,408	131,332
<b>Total .....</b>	<b>12,506,619</b>	<b>9,476,248</b>
Spelter .....	31,318	28,333
Sulphate of iron .....	35,215	28,381
Universal Portland cement .....	10,114,500 Bbl.	7,737,500 Bbl.

## Inventories

The following is a general classification of the inventory valuations at December 31, 1912, in comparison with the valuations at the close of the preceding year:

	1912.	1911.
Iron ores .....	\$62,002,998	\$73,642,448
Pig iron, scrap, ferro and spiegel .....	6,508,517	6,998,670
Coal, coke and other fuel .....	3,050,449	3,728,395
Pig tin, spelter, copper, nickel, aluminum and dross and skimmings .....	8,008,658	6,536,069
Limestone, fluxes and refractories .....	1,991,662	2,000,330
Rolls, molds, stools, annealing boxes, etc. ....	6,681,800	6,101,885
Manufacturing supplies, stores and sundry items not otherwise classified .....	15,716,369	13,682,475
Ingots, steel .....	1,686,044	1,278,318
Blooms, billets, slabs, sheet and tinplate bars, etc. ....	7,714,124	7,756,691
Wire rods .....	1,257,211	829,461
Skelp .....	1,709,708	968,516
Finished products .....	30,734,146	32,737,559
Mining supplies and stores (for ore and coal properties) .....	3,077,272	3,163,242
Railroad supplies and stores .....	3,546,969	3,350,134
Merchandise of supply companies .....	864,528	748,004
Material, labor and expense locked up in bridge and structural contracts, less bills rendered on account .....	4,399,182	5,401,293
Stocks abroad and on consignment .....	6,272,267	5,351,377
Material in transit .....	2,736,918	1,792,322
<b>Total inventory valuations to subsidiary companies .....</b>	<b>\$167,958,832</b>	<b>\$176,067,189</b>
Amount included therein representing profits of subsidiary companies on inter-company sales of materials and products on hand .....	15,546,578	22,383,600
<b>Valuation exclusive of inter-company profits .....</b>	<b>\$152,412,254</b>	<b>\$153,483,589</b>

(Continued on page 745)

ESTABLISHED 1855

# THE IRON AGE

Published Every Thursday by the  
**David Williams Company**  
 239 West 39th Street New York

W. H. Taylor - *President and Treasurer*  
 I. A. Mekeel - *First Vice-President*  
 Fritz J. Frank - *Secretary*  
 M. C. Robbins - *General Manager*

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**Branch Offices**  
 Chicago: Otis Building Philadelphia: Real Estate Trust Bldg.  
 Pittsburgh: Park Building Cleveland: American Trust Building  
 Boston: Compton Building Cincinnati: Mercantile Library Bldg.

Entered at the New York Post Office as Second-class Mail Matter

Subscription price: United States and Mexico, \$5.00 per year; to Canada, \$7.50 per year; to other foreign countries, \$10.00 per year.

## CONTENTS.

Methods Employed in Leaf Spring Manufacture.....	701
New Jersey and New York Labor Measures.....	705
Tool Steel from a Salesman's Point of View.....	706
Mineral Production of Canada in 1912.....	708
Turret Boring and Turning Tool Post.....	709
How a California Town Has Grown.....	709
Employees' Activities at a Cleveland Plant.....	710
Manganese Steel Castings .....	712
Heavy Lake Traffic in Ore and Coal.....	713
Basic Open-Hearth Steel Castings.....	714
Producing Solid Steel Ingots.....	715
Comparing the Motor Truck and the Horse.....	715
Blast-Furnace Slag-Analyses for 24 Hours.....	716
Steel Passenger Car Discussion.....	716
Lackawanna Steel Company's Report.....	717
Hyatt Roller Bearing Data.....	717
Report of La Belle Iron Works.....	718
Joint Meeting on Industrial Illumination .....	718
The American Radiator Company's Year.....	719
Exchanging Apprentices Among Works.....	719
A Large Hot Water Heater.....	719
British Foreign Trade in Iron and Steel.....	720
Mechanical Engineers' Baltimore Meeting.....	720
A Linde Oxygen Plant at Cleveland.....	720
United States Steel Corporation's 1912 Report.....	721
The Steel Corporation's Report .....	722
Purchases Under the Eight-Hour Law.....	723
Fuel Oil Situation .....	723
Wasted Time of Foremen.....	724
Correspondence .....	724
The Allis-Chalmers Reorganization .....	724
The Pittsburgh-Lake Erie Ore Rate Case.....	725
The New York Steel Company's Officers.....	725
The Steel Corporation Dissolution Suit.....	725
Milne & Co. to Occupy New Building.....	725
Iron and Metal Markets .....	726
Personal .....	740
Obituary .....	741
Pittsburgh and Vicinity Notes .....	741
Questions on Scientific Management .....	743
Sloss-Sheffield Annual Report .....	743
Milwaukee Foundry Conditions.....	743
Metal Trades Annual Meetings.....	744
To Handle the Tariff in the Senate .....	744
Labor Notes .....	744
Ore-Carrying Vessels for the Bethlehem Company.....	746
The Steel Corporation's Canadian City.....	746
The Machinery Markets .....	747
Trade Publications .....	756

## The Steel Corporation's Report

While the Steel Corporation's earnings in 1912 were known some weeks ago, the report for last year, which has just been given out, furnishes the first exact information we have had concerning output, the year's changes in capital account, the outlays for new construction, and other important features.

The intimation given in these columns one year ago that the Steel Corporation's 1912 percentage of the country's pig-iron, steel ingot and rolled steel production would be greater than that of 1911 is likely to be borne out by the complete figures, though as yet a comparison is only possible in the case of pig iron. With a production of 14,186,164 gross tons last year, the Steel Corporation's percentage of the country's output of 29,727,137 tons was 47.7, against 45.4 in 1911 and 43.3 in 1910.

The steel ingot production of the country for last year has not been ascertained as yet. In 1910 the Steel Corporation produced 54.3 per cent. of the total of steel ingots and castings, which was 26,094,919 tons, and in 1911, with 12,753,370 tons, its percentage of the total of 23,676,106 tons was 53.9. Knowing that pig-iron production has been running less than that of steel ingots and castings for the past two years, we have put the steel output in 1912 at 30,360,000 tons, or about 570,000 tons more than the pig-iron total. On that basis the Steel Corporation's output of 16,901,223 tons would represent 55.7 per cent. Turning to the table of finished steel production last year, as given elsewhere, we note that the Steel Corporation made its most conspicuous increases over 1911 in bar products, plates, heavy structural shapes, and sheets and tin plate. In plates the increase, due in good part to the large demand for steel cars, was over 70 per cent; in heavy shapes, 64 per cent.; in merchant steel and bar products, over 56 per cent.; in sheets and tin plates, about 40 per cent. Wire and its products, in spite of the increase in competition last year, a little more than held their own at 1,629,717 tons against 1,613,754 tons, though the increase is more when rods are taken in, the 1912 output being 196,720 tons against 118,302 tons. The total of finished products last year was 12,506,619 tons or more than 30 per cent. in excess of 9,476,248 tons in 1911—a remarkable forward leap.

The export shipments were 2,280,796 tons, against 1,746,492 tons in 1911. Of the country's iron and steel exports which are reported by weight, the Steel Corporation sent out 77.7 per cent. last year. While its increase was 30.6 per cent. over its own 1911 shipments, its percentage of the total exports is somewhat less than has been commonly conceded.

It seemed one year ago that the Steel Corporation, while it was far from being able to resume the policy of prosperous years like 1906 and 1907, when large amounts were set aside from surplus for new construction, had come to the point where it would need to do comparatively little in that line. Only a year ago its steel capacity seemed likely to be excessive for many months. But to-day it is again in the midst of a large programme of new construction and extensions. The Canadian plant is of chief importance in all this, with an expected outlay of \$20,000,000, but there is in all more than 1,500,000 tons (per year) of new open hearth steel capacity building or planned, and after that more blast furnaces must be provided. The result of all the activity of the year in new construction is a



net increase in the corporation's bonded indebtedness of \$22,482,881. There has been the greatest output ever known, but prices were low for most of the year, and to maintain dividends under such conditions compelled a suspension of the "squeezing out of water," of which so much was said in connection with the financing of the great work at Gary.

The statement of capital expenditures shows that the Gary work, including bridge shop and sheet mills, is practically completed. While \$7,939,813 was spent there in 1911, making the Gary total \$77,918,508, the outlay in new Gary work in 1912 was but \$1,725,052, or less than that for the Tennessee Coal, Iron & Railroad Company, which was \$1,833,094, while at Duluth \$2,676,066 was spent. The total expenditure on capital account last year was \$13,780,361. Of appropriations already made for new construction the amount unexpended at the close of 1912 was about \$40,000,000, of which it is expected about \$30,000,000 will be spent in 1913. One of the most significant facts in the report, therefore, is the very sharp revision 1912 has brought, of any opinion that the Steel Corporation or the steel industry at large has come to a resting place in the matter of outlays—prodigious outlays—for the building of new capacity.

### Purchases Under the Eight-Hour Law

One of Attorney General Wickersham's last decisions was of great importance to manufacturers, in that it settles the meaning of the Federal eight-hour law as to the obligation of contractors and general business houses in limiting the hours of employment in their establishments on work done for the Government. Machinery, structural steel and other materials and equipment to be installed in Government buildings, such as power generating machinery and elevators, are all exempt, whether manufactured to meet special requirements or otherwise. Section 2 of the law provides that nothing in the act shall apply to contracts "for the purchase of supplies for the Government, whether manufactured to conform to certain specifications or not, or for such materials or articles as may usually be bought in open market, except armor and armor plate, whether made to conform to certain specifications or not."

The Attorney General holds "that the intention of the exceptions under consideration was to exclude from the operation of the act all ordinary contracts of the Government, including within the act only those contracts of a character which will permit the contractor, as a practical matter, to adjust his plant or force to the basis of an eight-hour work day, and thus, on the one hand, render the law effective, and, on the other, allow the Government the benefit of large, open competition in the letting of contracts."

The decision followed a request for a ruling made by the Public Printer and refers more or less specifically to printing machinery and materials, but it applies as truly in all details to all classes or lines of manufacturing and was used by the Attorney General as a ruling as to materials and equipment purchased for Government buildings. For example, the following is one question that was answered: "Do the provisions of the act apply to purchases made by the Public Printer, in the open market or under formal contracts, of printing and binding machinery generally manufactured for sale commercially or specially built upon specifications

prepared for meeting a particular method of production for the Government printing office?" The answer is: "Printing presses are articles such as may be ordinarily bought in open market, and they do not cease to be printing presses because made to meet peculiar needs. They still remain in the excepted class, differing from their fellows in the class only because 'made to conform to particular specifications.'"

The Attorney General applied the same ruling as regards building materials and equipment, in answer to a request for information made by the Secretary of the Treasury, who brought up these points:

"In the construction and equipment of public buildings certain articles are required which the department has hitherto contracted to have manufactured to conform to certain specification requirements, but which articles, in their respective classes, can be purchased in the open market; for instance, lamp standards and brackets. These are articles of common use and can be purchased in the open market, but this department contracts for the manufacture of such as it requires from drawings prepared by the department and requires the contractor to agree that he will not make for any other customer any lamp standards or brackets from these drawings, either during the continuance of his contract with the Government or after its termination. Again, dynamos and engines are purchasable in the open market, but those installed in public buildings, while they resemble in appearance the dynamos and engines prepared by the respective manufacturers and are identical with those to be had in the open market, up to a certain point, are, in certain essentials, required to be constructed on lines which constitute a material difference in construction. Structural iron and steel are procurable by open market purchase, but stock materials are not often used in public building work. On the contrary, beams are rolled and columns fabricated for use in connection with a particular building, holes drilled for the rivets, etc. Again, sash, doors, moldings, etc., are procurable in the open market, but generally all the lumber for the interior finish of a public building is prepared in the mill of the sub-contractor. Do these classes of material come within the operation of the law?"

The Attorney General classed them all as exceptions. Without going into further details of the decision, it is easy to see that the relations of the Government and those from whom it makes its purchases have not been affected by the act which when it became a law last summer, was regarded with much apprehension. No matter how special an article or machine may be, the law does not operate to regulate hours of employment in the works of the manufacturer.

### The Fuel Oil Situation

The action of the producers of fuel oil four months ago in practically withdrawing that product from the market is leading to the rapid development of substitutes with the necessary apparatus and methods. Until quite recently, after the extraction of the several grades of gasoline and kerosene from the petroleum, the residue was considered as a by-product, valuable as fuel, also for the treatment of roads and some other purposes, and the cost to the consumer was low. The immense increase in the use of gasoline has made it profitable to extract the residual naphtha from the fuel oil, and that fact accounts in part for the present

attitude of the producers. Many plants are equipped to use oil as fuel in furnaces and forges, under boilers and for other purposes. Now the experts in the various substitutes are putting forth their best efforts in the attempt to give equally good results, and they are developing refinements which should be of great industrial value.

The heavier Mexican oil, of which the supply is enormous, is being used with some success in a modified type of apparatus, and promises to occupy a prominent place in the future. Common illuminating gas and producer gas are taking a more important place. That they contain sulphur has been, of course, an objection to their use in some metallurgical processes. But open-hearth furnace operations have long been based on gas producers, proper care being taken that the coal is low in sulphur, with all due precaution against "cold" gas and sluggish working of the furnace. In the various forms of heating furnaces and in the heat treatment of steel gas is used to an increasing extent. Welding has been done successfully, it is stated, using gas from a city main, containing the usual percentage of sulphur.

One theory of the present situation in fuel oil is that as soon as market conditions have driven large users to other fuels it will again be available to some of its present consumers in metal-working lines. The attempt now is, apparently, to reduce certain of the channels of consumption to the lowest possible point.

### Wasted Time of Foremen

Many shop foremen are compelled to devote too great a share of their time to clerical work, which could be done just as well by low salaried clerks. The condition is wholly natural; it comes on almost insidiously, so far as realization by the management is concerned, in the establishment of improved methods of keeping costs and increasing the efficiency of the establishment in other ways. The foreman's essential functions are to bring his department to a maximum of effective production and to maintain it there; to develop methods of manufacture; to preserve discipline among his men; to watch constantly that the product of their labor is up to the required standard; to keep down the idle hours resulting from absences. He is an important part of the industrial machine. His relations to the clerical department should be confined to suggestion on methods as they affect manufacturing. In a number of cases where foremen have been relieved of clerical labor it has been found that an astonishing amount of time was wasted, the increase in the effectiveness of supervision after the change being immediate and large.

## Correspondence

### American Visitors to German Works

*To the Editor:* We read with some astonishment in your esteemed journal on January 23, 1912, on page 264, an editorial on the subject, "Closing German Factory Doors." This article describes the experience of one Mr. Schmidt on a visit to German works and states that he had in general a very cool reception and in many cases was denied admission. Attention is called toward the end of the article to the hearty reception accorded German travelers visiting American works, and the statement ends with the hint that the factories of North America might

be closed also to German visitors. [Our correspondent is in error on this point.—Ed.]

Since, in the article mentioned, it was also intimated that the American Consul at Cologne had made a statement to the same Mr. Schmidt that the German Government had issued orders to all manufacturers that foreign visitors be not admitted to their works and especially that care be exercised as to American visitors, we turned to the American Consul at Cologne with request for an explanation. The Consul writes us accordingly, saying that he does not recall the visit of Mr. Schmidt, and that in any event he could not have stated that the German Government had ordered that foreign visitors be debarred from German factories.

In the issue of your journal, dated February 6, we further find a report of Richard Moldenke [secretary American Foundrymen's Association] on the same subject. Mr. Moldenke speaks more generally of European manufacturers and mentions no particular cases of blunt refusals of American visitors to European factories, but ends with the conclusion that the American visitors in Europe do not have the hearty reception on their visits to manufacturing plants that the Americans accord to foreign visitors. His report reaches its climax in the suggestion that it should be the understanding that foreign visitors to American plants reciprocate on the occasion of visits to works in their own land.

These representations, and especially those of the article in the issue of January 23, ought not to remain unanswered so far as German steel and iron industries are concerned. Without desiring to present statistics, we can emphatically state that dozens and dozens of Americans have visited us in the last year and have been cordially received by us, the doors of German steel plants being opened wide to them. We can prove that no complaint has come to us from any of our American friends of any denial of admittance to German works. On the contrary, we have before us many letters of thanks which testify to the cordiality with which American friends have been received on the occasion of visits to our plants.

Further, we might state that the proviso of Mr. Moldenke, that reciprocity in visiting be regarded as a mutually understood duty, will be respected; i.e., that the representatives of German works who have visited American plants will under no circumstances deny admittance to those belonging to like American concerns. In view of the very agreeable relations existing between the German and North American iron industries and the many ties which bind them closely together, we should deeply regret if such unfounded information in your widely read journal disturbed or weakened the friendly feeling existing between representatives of our industries. At any rate, a single case such as that of Mr. Schmidt, described in your journal, should not under any circumstances be generalized.

We close with the request that you take the opportunity to deny the reflection referred to and by so doing preserve and strengthen the friendly relations between the iron producers of the two countries in the same cordiality in which they have been maintained.

VEREIN DEUTSCHER EISENHÜTTENLEUTE,  
E. SCHROEDTER,  
General Manager.

DUESSELDORF, February 28, 1913.

### The Allis-Chalmers Reorganization

The Allis-Chalmers Mfg. Company, incorporated under the laws of Delaware, with \$42,500,000 capital stock (\$16,500,000 preferred and \$26,000,000 common), will take over and operate the properties of the old Allis-Chalmers Company as soon as the remaining reorganization steps are completed, probably by May 1. Directors and officers have already been elected. The directors are as follows: John H. McClement, chairman of board; O. H. Falk, president of the company; O. C. Fuller, J. D. Mortimer, G. G. Pabst and Frederick Vogel, Jr., all of Milwaukee; Max Pam and F. O. Wetmore, of Chicago; A. W. Butler, C. W. Cox, O. L. Gubelman, R. G. Hutchins, Jr., Arthur Coppel and W. C. Potter, of New York; J. P. Winchester, of Wilmington, Del. The executive committee is composed of Milwaukee men, as follows: Frederick Vogel, Jr., chairman; O. H. Falk, O. C. Fuller, J. D. Mortimer and G. G. Pabst.

### The Pittsburgh-Lake Erie Ore Rate Case

WASHINGTON, D. C., March 18.—Final argument was made before the Interstate Commerce Commission March 15 in the case of the Pittsburgh Steel Company against the Pittsburgh & Lake Erie Railroad Company. In this case the Pittsburgh Steel Company and other companies similarly situated attack the freight rate on iron ore from lower Lake Erie ports to Pittsburgh, and the contention is made that such rate, 96c. a ton, is unjustly discriminatory against the Pittsburgh district, as rates of 50c. and 60c. a ton are made to the Columbus and Wheeling districts respectively. Wade H. Ellis made the chief argument on behalf of the Pittsburgh Steel Company, and the railroad was represented by G. B. Gordon and O. E. Butterfield. It is expected that the commission will hand down its decision early in the spring so as to be applicable when the Lake traffic opens.

W. L. C.

### The New York Steel Company's Officers

The adjourned annual meeting of the New York State Steel Company was held at the company's offices in Buffalo, March 14, and the following directors were elected: Frederick R. Davidson, Pittsburgh; Louis R. Davidson, Buffalo; George Davidson, Beaver, Pa.; Frederick N. Beegle, Beaver Falls, Pa.; John D. Larkin, F. E. Porter and George H. Sicard, Buffalo. The directors then organized and elected the following officers: President, Frederick Davidson; vice-president, Louis R. Davidson; secretary and treasurer, George H. Sicard. Executive committee, John D. Larkin, Frederick Davidson and Louis R. Davidson. The company's blast furnace, which was shut down temporarily, will be put in blast at once and all departments of the plant, including the open-hearth furnaces and the rolling mill, will be operated at full capacity from now on.

**A Large Locomotive Contract.**—The Baldwin Locomotive Works has closed a contract for 144 heavy freight locomotives for the Pennsylvania Railroad Company. Delivery will be made in the summer. The amount of the order is approximately \$3,500,000. The Baldwin works are now operating 24 hours a day, with a full force. Orders on the books are sufficient to assure operation at capacity until well into the autumn. Only once before has a larger future business been definitely under contract and that was in the boom of 1906.

The Shotwell-Harris Company, Minneapolis, Minn., has had plans prepared for the erection of a manufacturing plant at Sixteenth street and Hennepin avenue. The building will be modern in every respect and will give employment to 200 men. The business was incorporated in October and is a merger of the J. H. Shotwell Company, the American Mfg. & Specialty Company, the Minneapolis Auto Radiator Company and the Minneapolis Ferrule Company, which were engaged in manufacturing copper products, automobile accessories and sheet metal work. These lines will be continued and special attention will be given to the development of patents. The officers of the company are J. H. Shotwell, president; Alfred B. Harris, vice-president and general manager, and A. A. Hobart, secretary and treasurer.

Announcement was made in St. Louis the past week that the project to build coke ovens which was to have been financed by an Eastern syndicate, including the Weld banking interests of New York, as well as James Campbell, president North American Company, had been abandoned, not only as related to St. Louis, but also as regarded the country generally. The reason given is that the advance in crude oil has led so many gas companies to plan coke ovens of the by-product type to supply them with gas that coke will become too plentiful for such a project as was planned to be readily successful. The syndicate had already optioned a site in north St. Louis, but the Laclede Gas Company's announcement of a \$5,000,000 plant at the southern end of the city precipitated the decision of the syndicate.

### The Steel Corporation Dissolution Suit

At the hearing in New York City on March 14, a considerable number of papers relating to the formation of the Steel Corporation were put in evidence by Edward S. Pegram, of J. P. Morgan & Co., in response to a subpoena. Among the papers thus produced were a contract, dated February 24, 1899, signed by William Nelson Cromwell, E. C. Converse and J. P. Morgan & Co.; a paper dated September 23, 1897, signed by E. H. Gary, G. H. Ten Broek and J. P. Morgan & Co.; a Federal Steel Company syndicate agreement and a National Tube syndicate agreement of June 22, 1899, and an American Bridge Company syndicate agreement, dated May 4, 1900. Mr. Pegram said he had been unable to find the original of the agreement between Andrew Carnegie and J. P. Morgan & Co., February 26, 1901, for the sale of the Carnegie property, and told of efforts to find it in the office and in a Brooklyn warehouse.

A clash between counsel occurred with regard to a copy of a letter written by Andrew Carnegie to J. P. Morgan & Co., February 2, 1901. Mr. Lindabury, of counsel for the corporation, wished to know why the Government had not put it in evidence, although it was in Mr. Pegram's budget. The counsel for the Government claimed that it was not the original agreement for the sale of the Carnegie Steel Company. The same contention arose regarding a letter from H. C. Frick to John D. Rockefeller and J. P. Morgan & Co., which had to do with the sale of the Lake Superior Consolidated Iron Mines to the Steel Corporation and which Government counsel claimed to have reason to believe was not the original agreement between J. P. Morgan & Co. and J. D. Rockefeller. Underlying the difficulty over these documents thus kept from the record is an idea by the Government prosecutors that before the contracts were made by J. P. Morgan & Co. for the purchase of the Carnegie steel properties and the Rockefeller ore lands there were agreements of which they had been able to get no evidence.

On the same day D. G. Kerr, vice-president of the Steel Corporation, was directed to give an estimate of the holdings of the various steel companies in the Mesaba district and elsewhere in 1903 and he produced papers to back up his testimony.

### Milne & Co. to Occupy New Building

A. Milne & Co., 30 Church street, New York, whose specialty is FJAB hollow and solid drill steel used in mining and quarrying, have erected and in a few days will occupy an office and warehouse building at 741-743-745 Washington street, New York. The structure is 60 x 80 ft., and the part facing the street is two stories. Construction of brick, concrete and steel, windows with metal frames and skylights of copper and wire glass make the building fireproof. The stockroom is electrically lighted and steam heated, the latter to prevent dampness and consequent rusting of the stock. At the rear of the stockroom is a large cage of bridge construction with a theoretical capacity of 1200 tons for the storage of long lengths of steel, and upright racks will afford ample provision for short lengths. The handling and weighing equipment is of the latest design. Two large doors, one for receiving and the other for deliveries, will permit the backing of vehicles into the building. Densmore & Le Clear, engineers and architects, Boston, Mass., designed the structure. Milne & Co. have handled steel other than the FJAB to some extent and intend to enlarge their line of tool steels.

The fortnightly bulletin of the American Railway Association showed that on March 1 the net surplus of idle cars on the lines of the United States and Canada was 31,381, an increase of 9198 cars in the last half of February. One year previous the surplus was 7842 and on March 1, 1911, it was 189,841.

The Industrial Works, Bay City, Mich., has established a Chicago agency in charge of Burton W. Mudge & Co., in the People's Gas Building. This office will handle in the Chicago district the company's widely known wrecking, locomotive and freight station cranes, pile drivers, transfer tables and grab buckets.



# The Iron and Metal Markets

## Implement Trade Buying Bars

### First Contracts Are at Current Prices

#### Steel Companies May Be in the Market for Pig Iron—Foundry Grades Weaker

Implement makers have begun to buy bars for the coming season and at Chicago 15,000 to 20,000 tons just placed was at the full contract price. The question with the agricultural bar and small shape business now pending is not so much one of getting the concession usual for years but of getting material when needed. Some of the mills are disposed to limit sales to six months periods, but the custom of buying from July to July is not likely to disappear.

While still less than shipments, buying has been better in the past week than in the first ten days of March. Weather and other conditions have given a new high rate of production and shipment, after all the remarkable records of the past six months. Much of the new business now coming out is for the third quarter.

The Steel Corporation has just bought 15,000 tons of steel billets in the East and South, but its continued purchases in the market have not prevented steel shortages. Its Sharon, Pa., and Elwood, Ind., tin plate plants were shut down March 17 for lack of steel. The Gary, Ind., sheet mill has also been idle in part for some days so as to accumulate steel.

In some products deliveries are easier and premiums are smaller. They have practically disappeared in sheets. Bars have succeeded plates as the most conspicuous premium product. Jobbers never had so large a share of the country's bar business.

There is further evidence of sharper competition among manufacturers of bolts and rivets. Prices presumed to be established have been cut to the extent of \$2 a ton.

Railroad buying has taken a fresh start. Chicago reports a 45,000-ton order for Bessemer rails, on which shipments have already begun. The Chicago & Alton has placed 7000 tons and a Texas road 15,000 tons. Export rail sales for the week have amounted to 20,000 tons. There are some large plans for bridge work, the requirements of the Pennsylvania Lines West being put at 25,000 tons. While car deliveries now run into the late months of the year, a number of roads are figuring. The Southern Railway will buy 3000 to 5000, the Seaboard Air Line 1800, the Grand Trunk 3000, the Buffalo, Rochester & Pittsburgh 1000 and the International & Great Northern 1000. The demand for spikes and track bolts is surprisingly heavy.

The tightness in semi-finished steel for rolling is still marked. A considerable inquiry for skelp has appeared and 1.45c. on grooved steel is minimum at Pittsburgh. Forging billets have been sold more freely in the Central West by Eastern producers, and at Cleveland prices \$1 to \$2 below the recent level have been named, while deliveries can be had in three or four weeks.

Pig iron stocks have increased in the South; in the North is the remarkable condition of increasing production with a further reduction in stocks. Those in Ohio and western Pennsylvania were but 365,000 tons on March 1, against 382,000 tons February 15. In Alabama from 70,000 tons, the low point last fall, furnace stocks had gone up to 122,000 tons March 1.

The Steel Corporation may have to buy iron, one or two more furnaces in the Pittsburgh district being on the verge of going out for repairs. Two of its stacks long idle may start up, but raw material must be accumulated. One independent steel company has had to curtail pig iron production, but bought metal early in the year. A 4000-ton sale of basic is reported at Pittsburgh, and there is a 5000-ton inquiry for third quarter. The close pig iron margin on which some steel companies are traveling keeps the market for steel making iron steady in spite of weakness in foundry grades.

The buying of 2500 tons of foundry iron by a Pittsburgh interest brought out a considerable dip in prices, No. 2 iron going below \$16.50 at furnace. Consumers are making no effort to provide for the third and fourth quarters in view of the weakness developed by piecing-out sales. Southern resale iron holds that market down to \$13, Birmingham, for No. 2 and as low as \$12.75 is authenticated.

Not only in iron ore but in coal vessel owners are preparing for a record-breaking traffic on the lakes this year. After several seasons of losses and gloom the vessel interests see some streaks of light. On a 100,000-ton block of ore under negotiation recently the sellers' option on vessel room carries a 5c. advance above the early contract rate.

## A Comparison of Prices

### Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

	Mar. 19, 1913.	Mar. 12, 1913.	Feb. 19, 1913.	Mar. 20, 1912.
<b>Pig Iron, Per Gross Ton:</b>				
Foundry No. 2 X, Philadelphia.	\$17.75	\$17.80	\$18.25	\$15.00
Foundry No. 2, Valley furnace.	16.50	17.00	17.00	13.25
Foundry No. 2 S'th'n, Cin'ti.	16.25	16.25	16.75	13.50
Foundry No. 2, Birmingham, Ala.	13.00	13.00	13.50	10.25
Foundry No. 2, furnace, Chicago*	17.25	17.25	17.25	14.00
Basic, delivered, eastern Pa.	17.50	17.75	18.00	14.50
Basic, Valley furnace	16.10	16.10	16.25	13.00
Bessemer, Pittsburgh	18.15	18.15	18.15	15.15
Malleable Bessemer, Chicago*	17.25	17.25	17.25	14.00
Gray forge, Pittsburgh	16.90	16.90	17.15	13.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	15.75

<b>Billets, etc., Per Gross Ton:</b>				
Bessemer billets, Pittsburgh	28.50	28.50	28.50	19.50
Open hearth billets, Pittsburgh	29.00	29.00	29.00	19.00
Forging billets, Pittsburgh	36.00	36.00	36.00	26.50
Open hearth billets, Philadelphia	32.00	32.00	32.00	22.40
Wire rods, Pittsburgh	30.00	30.00	30.00	25.00

<b>Old Material, Per Gross Ton:</b>				
Iron rails, Chicago	16.25	16.25	16.25	15.00
Iron rails, Philadelphia	18.00	18.00	18.00	15.50
Carwheels, Chicago	16.75	16.75	16.75	13.00
Carwheels, Philadelphia	15.00	15.00	15.00	11.75
Heavy steel scrap, Pittsburgh	14.25	14.25	14.00	13.00
Heavy steel scrap, Chicago	12.25	12.00	12.25	10.75
Heavy steel scrap, Philadelphia	13.50	12.50	12.50	11.75

<b>Finished Iron and Steel,</b>				
Per Pound to Large Buyers:				
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.67½	1.67½	1.67½	1.22½
Iron bars, Pittsburgh	1.70	1.70	1.70	1.25
Iron bars, Chicago	1.57½	1.57½	1.60	1.15
Steel bars, Pittsburgh, future	1.40	1.40	1.40	1.10
Steel bars, Pittsburgh, prompt	1.85	1.85	1.70	1.10
Steel bars, New York, future	1.56	1.56	1.56	1.26
Steel bars, New York, prompt	2.01	2.01	1.86	1.26
Tank plates, Pittsburgh, future	1.45	1.45	1.45	1.15
Tank plates, Pittsburgh, prompt	1.70	1.70	1.70	1.15
Tank plates, New York, future	1.61	1.61	1.61	1.26
Tank plates, New York, prompt	1.76	1.76	1.86	1.26
Beams, Pittsburgh, future	1.45	1.45	1.45	1.15
Beams, Pittsburgh, prompt	1.70	1.70	1.70	1.15
Beams, New York, future	1.61	1.61	1.61	1.26
Beams, New York, prompt	1.86	1.86	1.86	1.26
Angles, Pittsburgh, future	1.45	1.45	1.45	1.15
Angles, Pittsburgh, prompt	1.70	1.70	1.70	1.15
Angles, New York, future	1.61	1.61	1.61	1.26
Angles, New York, prompt	1.86	1.86	1.86	1.26
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.50	1.15
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.15
Steel hoops, Pittsburgh	1.60	1.60	1.60	1.25

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Mar. 19, Mar. 12, Feb. 19, Mar. 20,			
	1913.	1913.	1913.	1912.
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.35	2.35	2.35	1.80
Wire nails, Pittsburgh	1.75	1.75	1.75	1.60
Cut nails, f.o.b. Eastern mills	1.80	1.80	1.80	...
Cut nails, Pittsburgh	1.70	1.70	1.70	1.55
Fence wire, ann'd, 0 to 9, Pgh.	1.55	1.55	1.55	1.40
Barb wire, galv., Pittsburgh	2.15	2.15	2.15	1.90

## Coke, Connellsville, Per Net Ton, at Oven:

Pinnacle coke, prompt shipment	\$2.40	\$2.40	\$2.25	\$2.25
Pinnacle coke, future delivery	2.50	2.50	2.50	2.25
Foundry coke, prompt shipment	3.00	3.00	3.00	2.75
Foundry coke, future delivery	3.00	3.00	3.00	2.50

## Metals,

Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	15.00	15.12½	15.00	14.75
Electrolytic copper, New York	14.87½	15.00	14.87½	14.62½
Spelter, St. Louis	6.15	6.25	6.20	6.90
Spelter, New York	6.30	6.40	6.35	7.05
Lead, St. Louis	4.20	4.20	4.20	4.05
Lead, New York	4.35	4.35	4.35	4.10
Tin, New York	45.87½	46.60	49.25	42.15
Antimony, Hallett, New York	8.50	8.50	8.75	7.37½
Tin plate, 100-lb. box, Pittsburgh	\$3.60	\$3.60	\$3.60	\$3.30

## Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Plates.**—Tank plates ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.75c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼ in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 2	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.10
Boiler and flange steel	.20
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.40
Marine steel	.50
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over	

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. to 1.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over	

**Wire Rods and Wire.**—Bessemer, open-hearth and chain rods, \$30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.55; galvanized, \$1.95. Galvanized barb wire, to jobbers, \$2.15; painted, \$1.75. Wire nails, to jobbers, \$1.75.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

## Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	\$1.70	\$1.75	\$1.80	\$1.85	\$1.95	\$2.05	\$2.15	\$2.25
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight) in effect from January 1, 1913, iron pipe (full weight), from October 21, 1912:

Steel.		Butt Weld.		Iron.	
Inches.		Black.	Galv.	Inches.	Black.
¾, 1 and 1½	73	52½	54	¾ and 1	67
1½	77	66½	68	1	66
2 to 3	80	71½	73	1½	70
				2 to 2½	73

Lap Weld.		Lap Weld.	
2	77	1½	57
2½ to 6	79	2	57
7 to 12	76	2½ to 4	59
13 to 15	53	4½ to 6	62
		7 to 12	62
			56

## Plugged and Reamed.

1 to 3, butt	78	69½	1 to 1½, butt	71	60
2, lap	75	66½	2, butt	72	61
2½ to 4, lap	77	68½	1½, lap	55	44
			1¾, lap	66	55
			2, lap	67	57
			2½ to 4, lap	69	60

## Butt Weld, extra strong, plain ends.

¾, 1 and 1½	68	57½	1½	64	53
1½	73	66½	2	68	61
2 to 3	77	70½	2½ to 4	72	63
			2 and 2½	73	64

## Lap Weld, extra strong, plain ends.

2	74	65½	1½	66	60
2½ to 4	76	67½	2	67	59
4½ to 6	75	66½	2½ to 4	71	62
7 to 8	68	57½	4½ to 6	70	61
9 to 12	63	52½	7 and 8	64	54
			9 to 12	59	48

## Butt Weld, double extra strong, plain ends.

¾	63	56½	1½	58	50
1½ to 1½	66	59½	2 to 2½	61	53
2 to 2½	68	61½		63	55

## Lap Weld, double extra strong, plain ends.

2	64	57½	2	56	50
2½ to 4	66	59½	2½ to 4	61	55
4½ to 6	65	58½	4½ to 6	60	54
7 to 8	58	47½	7 to 8	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

**Boiler Tubes.**—Discounts to jobbers in carloads on lap welded steel, in effect from February 1, 1913, and standard charcoal iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap Welded Steel.	Standard Charcoal Iron.
1½ and 2 in.	1½ in.
2½ in.	1½ and 2 in.
2½ and 3½ in.	2½ in.
3 and 3½ in.	2½ to 3½ in.
3½ to 4½ in.	3 and 3½ in.
5 and 6 in.	3½ to 4½ in.
7 to 13 in.	Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

**Sheets.**—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows. f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.	Cents per lb.
Nos. 3 to 8	1.70
Nos. 9 and 10	1.75
Nos. 11 and 12	1.80
Nos. 13 and 14	1.85
Nos. 15 and 16	1.95

## Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	2.00
No. 12	2.00
Nos. 13 and 14	2.05
Nos. 15 and 16	2.10
Nos. 17 to 21	2.15
Nos. 22 and 24	2.20
Nos. 25 and 26	2.25
No. 27	2.30
No. 28	2.35
No. 29	2.40
No. 30	2.50

## Galvanized Sheets of Black Sheet Gauge.

	Cents per lb.
Nos. 10 and 11 .....	2.50
No. 12 .....	2.60
Nos. 13 and 14 .....	2.60
Nos. 15 and 16 .....	2.75
Nos. 17 to 21 .....	2.90
Nos. 22 and 24 .....	3.05
Nos. 25 and 26 .....	3.20
No. 27 .....	3.35
No. 28 .....	3.50
No. 29 .....	3.65
No. 30 .....	3.80

## Pittsburgh

PITTSBURGH, PA., March 18, 1913.

One of the local steel companies reports that its actual orders sent to the mills for rolling last week were a little over 5000 tons in excess of shipments, and another states that it also fell behind considerably in shipments last week, and on some lines of product is not promising deliveries for eight months. While a good many contracts for finished iron and steel expire April 1, and the contracts for second quarter delivery are at slightly higher figures, the mills state that specifications against the second quarter contracts are coming in freely and there are no signs of any abatement in activity. A meeting was held Tuesday between the sales and operating departments of a large steel company outside the Pittsburgh district to see if some plan cannot be worked out to secure larger output and make deliveries to customers that will be more satisfactory. The pressure on the mills for deliveries is just as strong at present as at any time since the activity started nearly a year ago and there is an entire absence of speculative buying. If the material now on the books of the mills is specified for it is practically certain that they will operate to maximum capacity over the entire year. Consumers who are not covered with material for last half of the year have negotiations on with the mills and seem willing to contract for third and fourth quarters at present prices. One leading maker of steel bars is refusing to book new orders for fourth quarter delivery at the 1.40c. price and is quoting as high as 1.55c. at mill. The low stocks of pig iron all over the country give evidence that, in spite of the record production, it is going into actual consumption as fast as it is being turned out. Specifications in the wire trade are reported a little better and two of the leading tin plate mills report business coming in more freely. Coke is quiet, but seems to be begged at \$2.40 to \$2.50 at oven for prompt delivery. The scrap market is still dragging, with prices unchanged.

**Pig Iron.**—Reports that the Republic Iron & Steel Company had bought 10,000 tons of basic iron for May and June delivery are incorrect. This company recently blew out its Hannah furnace at Youngstown for relining and repairs, and as soon as this stack is blown in No. 1 Haselton will go out for repairs but the company states that its purchases of pig iron six or eight weeks ago were made in view of these two furnaces being idle, and that it has enough iron to cover its needs up to July at least. The Youngstown Sheet & Tube Company expects to start part of its new open-hearth plant within the next six weeks, but it is also provided with iron and its new stack D at Youngstown will probably be ready to blow in about May. The total purchases of basic iron by the Carbon Steel Company of this city for second and third quarters amounts to 5000 tons, all bought from one interest on the basis of \$16.10 at Valley furnace, and it has an inquiry out for 5000 tons more for third quarter. It is claimed that two local steel interests are about ready to come in the market for a large tonnage of basic for second quarter and some buying of Bessemer is looked for in the very near future. The Westinghouse Electric & Mfg. Company has bought about 2500 tons of foundry iron for second quarter of grades equal to Nos. 2 and 3 Northern, the price paid for No. 2 Northern being below \$16.50, Valley furnace. Prices on foundry iron are weak and there are other reports that \$16.50, Valley, has been shaded. Considerable buying of basic and Bessemer iron is looked for within the next week or two. We quote standard Bessemer iron, \$17.25; malleable Bessemer, \$16.75 to \$17; basic, \$16.10; gray forge, \$16; No. 2 foundry, \$16.50, all f.o.b. cars Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

(*Later by Telegraph.*)—The Follansbee Brothers Company has bought 4000 tons of basic for March and April delivery, a part of this business being taken by a Cleveland interest which has been an active seller of basic recently.

**Billets and Sheet Bars.**—As indicating how acute the shortage is in supply of billets and sheet bars and the trouble consumers are having in getting deliveries, on Monday, March 17, the Sharon and the Elwood (Ind.) works of the American Sheet & Tin Plate Company, the two plants containing 43 hot mills, were shut down for lack of steel. There is an active demand for small lots of billets and sheet bars, and sales are being made almost daily. We note one sale of 900 tons of open-hearth billets for second quarter delivery at \$29.50, Pittsburgh. There has been a good deal of delay in the building of the new open-hearth steel plant of the Carnegie Steel Company at Bessemer, and it is not likely to make any steel before August or later. Small lots of billets and sheet bars for prompt delivery from dealers continue to bring slight premiums over prices named below, which represent the regular market for shipment from mill. We quote: Bessemer billets, \$28.50 to \$29; Bessemer sheet bars, \$29 to \$29.50; open-hearth billets, \$29 to \$29.50, and open-hearth sheet bars, \$29.50 to \$30, f.o.b. mill, Pittsburgh or Youngstown. Forging billets, \$36 to \$37, and axle billets, \$34 to \$35, Pittsburgh.

**Ferroalloys.**—Consumers are pretty well covered to July, and in most cases over the entire year, so that any new buying is in small lots only and made necessary by delayed shipments on contracts. The new rates on ferromanganese are in effect, the freight rate on imported from Baltimore to Pittsburgh being \$2.30; from Philadelphia \$2.40 and from New York \$2.60 per gross ton. Freight rates on domestic are the same as on imported. We note sales of two cars, or about 60 tons, of 80 per cent. English ferromanganese at \$64 seaboard. Contracts for ferromanganese are always made at so much per ton seaboard, so that the consumers are paying the increase in freight rates. We quote 80 per cent. foreign ferromanganese at \$64 to \$65, Baltimore, the rate to Pittsburgh being \$1.95 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$75; over 100 tons to 600 tons, \$74; over 600 tons, \$73, Pittsburgh. We quote 10 per cent. at \$24; 11 per cent., \$25; 12 per cent., \$26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

**Wire Rods.**—New inquiry is light, but the mills report that consumers are specifying freely against contracts. Owing to the scarcity and high prices of billets, rods are firm and we quote Bessemer, open-hearth and chain rods at \$30, Pittsburgh.

**Muck Bar.**—A local consumer reports that it bought recently 400 to 500 tons of strictly high grade muck bar made from all pig iron at about \$32 delivered, the bar netting the seller about \$31.50. This is the first actual sale of muck bar reported in this market for some time. We continue to quote best grades, made from all pig iron, at \$31 to \$31.50, maker's mill, Pittsburgh.

**Skelp.**—A pipe mill sent out an inquiry recently for about 5000 tons of grooved steel skelp for delivery in second quarter and states the lowest price named was 1.45c., one maker quoting a higher figure. The skelp mills are filled up for the next two or three months and the market is very firm. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.90c., delivered at buyers' mills in the Pittsburgh district.

**Steel Rails.**—The Carnegie Steel Company is entering good-sized orders for standard sections for export shipment and reports that domestic railroads are specifying very freely on their contracts placed some time ago. The new demand for light rails is active, the Carnegie company having received in the past week new orders and specifications for about 4000 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots f.o.b. Pittsburgh.

**Carwheels.**—The Carnegie Steel Company has sold the Pennsylvania Railroad 840 steel wheels to be used in equipping 105 passenger cars being built for that road by the Pressed Steel Car Company. Several large inquiries for cast-iron and steel carwheels are reported in the market. We quote 33-in. rolled steel wheels for freight service at \$15 to \$15.50 and 36-in. for passenger cars at \$19 to \$19.50 per wheel, f.o.b. Pittsburgh.

**Structural Material.**—New inquiry has been active, but only a relatively small amount of work has been placed in this district. A part of the building fronting



on Fifth avenue, now occupied by the Kaufmann Brothers' department store, is to be torn down and replaced with a new structure, which calls for 4800 to 5000 tons of steel, bids on which have been asked. It is understood the contractor that gets this job will have to guarantee completion of the new building by December, so that whoever takes the steel will have to make very prompt deliveries. Bids have not yet been asked on the steel for the new Kaufmann-Baer department store on Smithfield street, which will take 5000 to 6000 tons. The Jones & Laughlin Steel Company has taken about 250 tons of pier caissons for the Panama Canal; it has furnished all caissons for that work. The McClintic-Marshall Construction Company has taken a crane runway for the Youngstown Sheet & Tube Company, about 200 tons, a foundry building for Yost Brothers at Tarentum, Pa., about 150 tons, and garage for R. B. Mellon, this city, about 100 tons. It is stated that the Pennsylvania Lines West are in the market for about 25,000 tons of bridge material for delivery over remainder of the year. We quote beams and channels up to 15 in. at 1.45c. to 1.50c. for delivery at convenience of the mill, which would be second half of this year, while small lots from warehouse for prompt delivery are bringing from 1.60c. up to 2c., depending on the size of the order and the deliveries wanted.

**Plates.**—The Pennsylvania Railroad has placed contracts for 307 passenger cars, divided nearly equally among the Standard Steel Car Company, the Pressed Steel Car Company and the American Car & Foundry Company. The Buffalo, Rochester & Pittsburgh Railroad, which bought a large number of cars some months ago, is figuring on 1000 more and the Seaboard Air Line is asking for 1000 box, 250 hopper, 300 phosphate and 250 flat cars. New orders for steel cars are very slow in being placed, but it is said that inquiries now in the market aggregate 12,000 to 15,000 cars. Reports that the Pennsylvania Railroad would buy 4500 more cars are officially denied. The Carnegie Steel Company has taken a contract for about 1800 tons of plates for the East Jersey Pipe Company, and will also furnish the plates for three miles of 36-in. pipe to be laid by the same interest. It is said the supply of plates for reasonably prompt deliveries is a little better, but premiums ranging from \$4 up to \$7 and \$8 a ton are still being paid. We quote ¼-in. and heavier tank plate at 1.45c., Pittsburgh, for forward delivery, while for shipment in three or four weeks 1.60c. to 1.65c. is quoted for carload and larger lots, and from 1.75c. to as high as 2c. for small lots, f.o.b. Pittsburgh.

**Iron and Steel Bars.**—There is no abatement whatever in the new demand for steel bars which continues abnormally heavy, while specifications against contracts are still in excess of shipments by the mills. With engagements already on its books, together with business that will naturally come along, the Republic Iron & Steel Company has practically sold up its entire output of steel bars for this year. It started on Tuesday a new 8-in. mill at its Brown-Bonnell works on which small bars will be rolled. Leading makers of steel bars have actual orders on their books covering their output to August or later and have contracts that, if specified for, will take their entire output to October or later. The new demand for iron bars continues active, one local maker stating that its output is sold up to July and that it has been offered premiums of \$2 to \$3 a ton for prompt deliveries which it has declined. The bar iron mills are enjoying a period of greater prosperity than has been their lot for some years. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill, which would not be before third quarter, while for shipment from warehouses 1.90c. to 2c. is quoted. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt delivery. Mills charge \$1 extra per ton for twisting ¾ in. and larger steel bars and \$2 extra for ½ to ¾ in.

**Sheets.**—As indicating the extent to which the sheet mills have their output sold up, on a recent very desirable specification which included 100 tons of No. 28 gauge black Bessemer sheets, one leading mill stated that the best delivery it could promise would be four months. Demand continues heavy and for electrical and other high grade sheets is particularly active, one mill that makes a specialty of electrical sheets reporting its entire output sold up to September. While business is perhaps not so active as it was at the close of last year, specifications against contracts are abnormal and so far this month have been larger than shipments. The shortage in supply of sheet bars continues very acute and is restricting output materially. There is a heavy demand for black and galvanized sheets for delivery in third quarter, but some of the

mills are still refusing to sell at present prices for that delivery except to manufacturing customers. The market is very firm, and it is stated there is absolutely no cutting in prices of sheets in this district. We quote 1.75c. for No. 10 blue annealed; 2.35c. for No. 28 Bessemer black sheets; 3.50c. for No. 28 galvanized, and 2.30c. for No. 28 tin mill black plate. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

**Tin Plate.**—Slight improvement was noted in the past week in specifications against contracts for tin plate, but they are still below expectations of the mills, which looked for a heavy business at this time. Jobbers have heavy stocks accumulated in the last two months of last year and the first month of this year when specifications against contracts taken last year came in very freely with the result that consumers have not yet commenced to specify very freely against contracts made last fall at present prices. On Monday, March 17, the American Sheet & Tin Plate Company was operating to only about 68 per cent. of capacity, due to the fact that its Sharon and Elwood works were shut down for lack of steel. All the tin plate mills are more or less hampered in operations by the shortage in steel, which does not promise to be any better before the late summer. We quote 100-lb. cokes at \$3.60, 100-lb. ternes at \$3.45, and No. 28 black plate at \$2.30, all f.o.b. Pittsburgh.

**Spelter.**—The market is firmer and demand is reported more active. We quote prime grades of Western spelter at 6.25c., East St. Louis, equal to 6.37½c., Pittsburgh.

**Railroad Spikes.**—Within a short time the railroads will commence to lay rails and this is reflected in more liberal specifications against contracts for spikes. One leading Eastern railroad recently specified for about 12,000 kegs, deliveries running up to October. All the spike makers have their output sold up for the next three or four months and small spikes are very hard to obtain for any delivery. We quote railroad spikes in base sizes, 5½ x 9/16 in., on large contracts with the railroads, at \$1.80, while for carload lots \$1.90 is charged; small railroad and boat spikes, \$1.90 to \$2 per 100 lb., f.o.b. Pittsburgh, for forward delivery.

**Hoops and Bands.**—Consumers are well covered up to July 1 and there is a good deal of new inquiry for hoops and bands for delivery in the second half of the year. Specifications against contracts are coming in very freely and the mills are still back in deliveries six weeks to two months or longer. We quote steel hoops at 1.60c. to 1.65c. and steel bands at 1.40c. to 1.45c., extras on the latter as per the steel bar card, these prices being for delivery at convenience of the mill. For prompt shipment premiums are being paid.

**Shafting.**—New demand is light, as consumers are covered ahead to July or longer, but makers state that specifications are coming in quite freely. Implement makers have inquiries out for their supply of shafting for the year commencing July 1, but it is stated that so far very little of this business has been closed. We quote cold rolled shafting at 58 per cent. off in carload lots, and 52 per cent. in small lots delivered in base territory, the usual slight differential over these discounts being allowed to the very largest consumers.

**Bolts and Rivets.**—A local maker reports having taken a contract for about 50 tons of rivets for forward delivery and at the full prices. Deliveries of steel bars by the mills are very unsatisfactory and is interfering with output of rivets to considerable extent. Except in very isolated cases it is stated that regular prices are being firmly held. We quote button-head structural rivets at \$2.20 and cone-head boiler rivets at \$2.30 per 100 lb. The discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	.....80 and 10% off
Small carriage bolts, cut threads	.....75 and 5% off
Small carriage bolts, rolled threads	.....75 and 10% off
Large carriage bolts	.....70% off
Small machine bolts, cut threads	.....75 and 10% off
Small machine bolts, rolled threads	.....75, 10 and 5% off
Large machine bolts	.....70 and 7% off
Machine bolts with C.P.C. and T. nuts, small	.....75 and 5% off
Machine bolts with C.P.C. and T. nuts, large	.....70% off
Square hot pressed nuts, blanked and tapped	.....\$5.70 off list
Hexagon nuts	.....\$6.30 off list
C.P.C. and R. square nuts, tapped and blank	.....\$5.70 off list
Hexagon nuts, ¾ and larger	.....\$6.60 off list
Hexagon nuts smaller than ¾	.....\$7.20 off list
C.P. plain square nuts	.....\$5.20 off list
C.P. plain hexagon nuts	.....\$5.50 off list
Semi-finished hexagon nuts ¾ and larger	.....85% off
Semi-finished hex. nuts smaller than ¾	.....85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	.....75, 10 and 10% off
Rivets, metallic tinned, bulk	.....3½c. per lb. net extra
Rivets, tin plated, bulk	.....1½c. per lb. net extra
Rivets, metallic tinned, packages	.....70, 10 and 10% off

**Merchant Steel.**—A leading mill reports that so far this month its specifications against contracts are 20 per cent. heavier than in the same period in February and were considerably in excess of shipments. The scarcity of steel is being severely felt in this trade and is restricting output to some extent, two mills reporting that they are back in deliveries from eight to ten weeks. Prices are firm and we quote: Iron finished tire,  $1\frac{1}{2}$  x  $\frac{3}{4}$  in. and larger, 1.40c. to 1.55c., base; under  $1\frac{1}{2}$  x  $\frac{3}{4}$  in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire,  $\frac{3}{4}$  to  $\frac{7}{8}$  and 1 in., 1.90c. to 2c.;  $1\frac{1}{8}$  in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and  $1\frac{1}{2}$  in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

**Wire Products.**—A slight betterment in specifications for wire nails is reported, but the volume of business being placed with the mills is still unsatisfactory. Jobbers accumulated large stocks by specifying heavily against contracts in November and December, and as yet these stocks have not yet started to move out very freely. As soon as spring demand starts and jobbers commence to move nails and wire on hand specifications with the mills will no doubt show quick improvement. There are persistent reports of an advance of \$1 a ton in wire products to be made between now and April 1, but nothing official about this can be learned here. It is stated that regular prices are being consistently quoted on new orders, but the mills still have a good deal of business on their books in wire nails at the \$1.70 basis and in the fence wire at the \$1.50 basis. We quote wire nails at \$1.75 per keg; cut nails, \$1.70 per keg; galvanized barb wire, \$2.15 per 100 lb.; painted, \$1.75; annealed fence wire, \$1.55, and galvanized fence wire, \$1.95, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

**Merchant Pipe.**—There is a steady, consistent demand for merchant pipe, actual orders entered by the mills so far this month showing a slight gain over the same period in February. As previously noted, some very large gas and oil projects are under way which will require a very heavy tonnage of the larger sizes of pipe. One of these, involving several hundred miles of large pipe, may possibly be put through this week, and there is every indication that the demand this year for pipe for gas and oil lines will be the heaviest ever known. It is stated that discounts on iron and steel pipe as given on a previous page, are now being quite generally observed.

**Boiler Tubes.**—New demand for locomotive and merchant tubes continues heavy, particularly for locomotive tubes, several very large inquiries being in the market at present. In seamless tubing the demand has been very heavy for some months, one leading maker being back in deliveries close to five months. Discounts on iron and steel boiler tubes are reported as being firmly held.

**Coke.**—The market is quiet, new inquiry being light, but prices are fairly strong. Several blast furnace consumers of coke who did not contract for their supply for the first half of this year are buying from month to month, and this is about all the new business that is going. Suspensions of shipments of coke to leading consumers are quite frequent and this results in a good deal of coke loaded on cars that has to be sold at the best prices it will bring. New inquiry for foundry coke is also dull, consumers being pretty well covered to July and in some cases over the entire year. Shipments of coke are going forward very freely and there is practically no delay in deliveries by the railroads. We continue to quote standard makes of furnace coke for prompt delivery at \$2.40 to \$2.50 and on contracts over remainder of the year at \$2.50 per net ton at oven. We quote best grades of 72-hr. foundry coke for prompt delivery at \$3 to \$3.50 per net ton at oven. The output of coke in the Upper and Lower Connellsville regions last week is given by the Connellsville Courier as 413,285 net tons, a decrease over the previous week of 19,360 tons.

**Iron and Steel Scrap.**—The local market does not show any betterment in demand or prices, and very little material is moving from dealers to consumers. It is probable that dealers could sell quite freely of heavy melting steel scrap at about \$14 delivered, but they are afraid to go short on this material as a buying movement is looked for at any time. Consumption of

scrap has been very heavy for a long time, but the supply seems to be amply large, and with two leading consumers out of the market there is a surplus which is holding the market down to its present low level. It is stated that the Pittsburgh Steel Company has bought practically no scrap for its Monessen works this year. It is taking some of the ground formerly used for scrap storage purposes to locate ore bins and for this reason is carrying a lighter supply of scrap than usual. Machine shop turnings are freely offered at \$8.50 and were turned down at this price. A sale of 500 tons of bundled sheet scrap is reported at \$8.50, shipping point. Prices are none too strong and we quote, per gross ton, delivered in the Pittsburgh and nearby districts as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery .....	\$14.25 to \$14.50
No. 1 foundry cast .....	14.25 to 14.50
No. 2 foundry cast .....	13.25 to 13.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district .....	10.50 to 10.75
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. ....	16.25 to 16.50
No. 1 railroad malleable stock .....	13.50 to 13.75
Grate bars .....	10.75 to 11.00
Low phosphorus melting stock .....	17.00 to 17.25
Iron car axles .....	24.25 to 24.75
Steel car axles .....	17.75 to 18.00
Locomotive axles, steel .....	21.75 to 22.00
Locomotive axles, iron .....	26.00 to 26.25
No. 1 busheling scrap .....	13.25 to 13.50
No. 2 busheling scrap .....	9.50 to 9.75
Old carwheels .....	15.75 to 16.00
*Cast-iron borings .....	10.00 to 10.25
*Machine shop turnings .....	8.50 to 8.75
?Steel bar crop ends .....	16.00 to 16.25
Old iron rails .....	16.25 to 16.50
No. 1 railroad wrought scrap .....	16.00 to 16.25
Heavy steel axle turnings .....	12.50 to 12.75
Stove plate .....	10.25 to 10.50

\*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

?Shipping point.

## Philadelphia

PHILADELPHIA, PA., March 18, 1913.

Apathetic conditions are more pronounced in the pig-iron market. Buyers hold out for concessions, but in few grades has any material volume of business been done. Cast-iron pipe makers have been the heaviest buyers. The finished material situation continues very good. Eastern plate and shape mills are booking a steadily increasing volume of business and deliveries have materially hardened. Billet makers are taking good orders, forging billets being exceptionally active. Some mills are practically turning business away, not being able to quote on the deliveries asked. Sheets are active and a better volume of business is moving in iron bars. The Baldwin Locomotive Works has booked considerable business, including 144 engines for the Pennsylvania Railroad. Shipbuilders are figuring on a large amount of work, exclusive of the proposed Schwab ore boats for the Chilean trade, for which orders have not yet been placed. Car builders have been heavy buyers. The old-material market has a firmer appearance, although business continues light. A wide range of prices is named for coke.

**Iron Ore.**—Offerings have been heavier, although in few instances are furnaces showing any interest in the market. Occasional small sales, to piece out supplies, are reported. Lower freights again favor the importation of ore from Europe, although little business has been put through. Importations during the week include 3000 tons from Venezuela, 4400 tons from Spain and 10,700 tons from Cuba.

**Pig Iron.**—Buyers maintain a waiting attitude, although showing more quiet interest in the situation. With prices soft the disposition is to hold off as long as possible to permit the market to reach a level before any heavy business is placed. On the other hand sellers generally are refraining from forcing a market by making concessions. Furnaces recently holding at high prices are now pretty generally quoting on a basis of \$18, delivered, for standard eastern Pennsylvania brands of No. 2 X foundry, and in close competition would no doubt meet quotations of \$17.75, delivered, which are being made by some producers, but no inquiry has developed which would result in any scramble for the business. Buying in the higher foundry grades has been confined to small lots for near future delivery, largely of a non-competitive character, for which prices usually range close around \$18, delivered, for No. 2 X foundry. Business at the recent \$18.25, delivered, basis for this grade is gradually disappearing. As has been the case for several weeks low-grade iron has been the most active. One Delaware River consumer has taken a lot of upward of 5000 tons at close to \$16.25, delivered, and has



also made smaller purchases. Quiet inquiry for low-grade pipe iron is still reported, although no definite tonnage is involved. A Virginia pipe maker, recently in the market for 3000 tons for third quarter, has temporarily withdrawn. Very little business is moving in the higher grades of Virginia foundry. At the ruling quotation \$15.50 at furnace for No. 2 X, the delivered price in this district, which ranges from \$18.30 to \$18.50, is entirely out of line with the current prices for eastern Pennsylvania brands. A sale of 1000 tons of special Virginia foundry iron at \$16.50 at furnace is noted. Consumers of malleable and charcoal pig have been buying odd lots, but there is an absence of any important inquiry. More activity has developed in rolling-mill forge, moderate lots having been sold at close to \$17, delivered. More inquiry for this grade is noted, although the expected heavy demand on the part of a large up-state consumer has not yet developed. Forge-iron prices are not strong; a good buyer would have little difficulty in doing \$16.75, delivered, for standard analysis iron. Steel-making grades are quiet. Small basic consumers are quietly feeling around for moderate supplies, but no definite tonnage is before the trade. Sales of small lots of low-phosphorus pig have been made at \$24.50, delivered. A sale of about 600 tons of off Bessemer is also reported. While prices are weak there have been no sales which would establish a firm low level. Makers in instances hold at the top, while others will accept inside quotations. The following range about represents the market for standard brands, delivered in buyers' yards, in this district:

Eastern Pennsylvania No. 2 X foundry	\$17.75 to \$18.00
Eastern Pennsylvania No. 2 plain	17.50 to 17.75
Virginia No. 2 X	18.30 to 18.50
Virginia No. 2 plain	18.05 to 18.25
Gray forge	16.75 to 17.00
Basic	17.50 to 17.75
Standard low phosphorus	24.50

**Ferroalloys.**—There has been more activity in prompt 80 per cent. ferromanganese, a number of sellers disposing of carload lots at \$65 seaboard. No inquiry for forward ferro has come out. Importations of 80 per cent. at this port last week aggregated 886 tons. Small sales of 11 per cent. furnace ferrosilicon have been made at \$26.30 delivered here, but inquiry for 50 per cent. is light.

**Billets.**—The demand continues active, particularly for forging billets, which, for early delivery, are scarce. Eastern mills have entered numerous orders ranging up to 1000 tons, for both rolling and forging steel, in a number of cases for Western shipment. Canada has also been an active buyer, particularly for forging billets. Consumers are urging mills for shipments against contracts, makers finding it more difficult to meet their demands. Makers continue to take on third-quarter business and are now pretty well covered on second-quarter capacity. Prices are strong, basic open-hearth rolling billets being quoted at \$32 delivered in this vicinity, with forging billets at \$36 mill, minimum for ordinary analysis specification.

**Plates.**—A very healthy demand continues. Eastern mills are taking orders which aggregate in tonnage more than productive rates and are steadily falling behind on deliveries. Bridge and car plates have been the most active, considerable business coming from the West, which for reasonable delivery, are entered at full prices. Good inquiries continue to come from car builders, involving quantities up to 1000 tons. Producers in the East have not opened order books for third-quarter delivery although there has been a large amount of inquiry for that and even more extended shipment. Prices quoted by Eastern mills are firm at 1.75c. for sheared and 1.80c. for universal plates, delivered in this district.

**Structural Material.**—A larger volume of business in fabricated structural work is coming out. The Pennsylvania Railroad is inquiring for the construction of a number of bridges, which will require several thousand tons of material. The city of Baltimore is asking for bids for a steel truss bridge at Loch Raven, Md. Considerable material will be required for a proposed elevated road in the northeast section of the city, to replace grade crossings of a branch of the Pennsylvania Railroad. Several fair size building projects are also pending. Plain shapes for near future delivery are in good demand and mills are operating at full capacity. Eastern mills quote 1.75c. delivered for plain shapes for near future delivery, although 1.60c. can be done for extended delivery. On prompt lots, up to 2c. is obtained.

**Sheets.**—Mills report the demand better than ever. Heavy orders have been entered and deliveries are

again hardening. Miscellaneous business is in good volume. Prices are firm at 1.90c. delivered here, for Western No. 10 blue annealed sheets, with Eastern mills, making smooth, loose-rolled sheets quoting 2c.

**Bars.**—The demand for iron bars has been somewhat better although mills are not all booked far ahead and continue to seek business. Prices of ordinary iron bars have been pretty firmly fixed at 1.60c. mill, or 1.67½c. delivered here, but some mills have no difficulty in obtaining 1.72½c. to 1.77½c. according to grade. Steel bars are active and for forward shipment are quoted at 1.55c. to 1.60c. delivered here, but for prompt shipment command up to 1.85c. here.

**Coke.**—Moderate sales of foundry coke are being made for second quarter at prices which show a rather wide range. Standard Connellsville foundry coke is quoted at about \$3.50 at oven, although from other districts, sales down to \$2.50 have been made. A sale of 5000 tons of standard furnace coke was made at \$2.50, although \$2.25 can be done on other brands. Heating coke has been sold at \$2.15 at oven. Prompt offerings in all grades appear lighter. The following range of prices, per net ton, is named for delivery in buyers' yards in this district:

Connellsville furnace coke	\$4.30 to \$5.00
Connellsville foundry coke	5.00 to 5.75
Mountain furnace coke	4.25 to 4.75
Mountain foundry coke	4.75 to 5.50

**Old Material.**—From a sentimental standpoint the market is stronger, although not substantiated by actual buying. Sellers are less inclined to let go at ruling prices as a higher market is expected. No important sales of No. 1 heavy melting steel are reported but mills would pay \$13.50 delivered. Merchants have paid up to \$13.75 for this grade, applying purchases on old high price contracts. Railroad wrought has been in a shade better demand, some mills offering \$15.50 delivered. Low-phosphorus scrap, in the absence of demand, is weak. Both buyers and sellers are awaiting developments, meantime quotations, which are largely nominal, range as follows for small lots, delivered in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel	\$13.50 to \$13.75
Old steel rails, rerolling (nominal)	15.50 to 16.00
Low-phosphorus heavy melting steel scrap	17.75 to 18.25
Old steel axles (nominal)	19.00 to 20.00
Old iron axles (nominal)	27.00 to 28.00
Old iron rails	18.00 to 18.50
Old carwheels	15.00 to 15.25
Old steel axles (nominal)	19.00 to 20.00
Wrought-iron pipe	12.50 to 13.00
No. 1 forge fire	12.00 to 12.50
No. 2 light iron (nominal)	7.00 to 7.50
No. 2 cut busheling	10.00 to 10.25
Wrought turnings	10.00 to 10.50
Cast borings	10.00 to 10.50
Machinery cast	14.00 to 14.50
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00
Railroad malleable (nominal)	13.00 to 13.50

A. M. Wood & Co., Arcade Building, Philadelphia, Pa., dealers in iron and steel, scrap, cut nails, etc., have incorporated their business under the laws of Delaware. The title of the corporation is A. M. Wood & Co., Inc. A. M. Wood is president and treasurer and A. J. Hofmann is assistant treasurer and secretary.

## Chicago

CHICAGO, ILL., March 19, 1913.—(By Telegraph.)

Business in steel products in the past week is interesting because of the inclusion of the first of the agricultural implement bar contracts for the coming season. There is apparently less question about prices on this business than about the ability of the mill to accommodate their regular customers. A purchase of 45,000 tons of Bessemer rails is noted; there is also an undiminished activity in spikes and track bolts. A few additional inquiries for noteworthy lots of cars are reported. In structural steel more interest attaches to the heavy demand for the lighter shapes from store than to the mill situation, in which there has been no change. While new business is not appearing in the same heavy volume as recently, there is more offered still than local mills care to consider. This is true of sheets for second half delivery, among other things, notwithstanding appearances of weakness occasionally where the smaller mills are seeking to keep their running schedules filled. Concessions from the nominal prices of rivets are also the rule. The pig iron market is exceedingly quiet, with practically no sales reported, al-



though inquiry is quite general. A degree of activity in the buying of scrap has strengthened the local market temporarily and prices of standard grades are slightly higher.

**Pig Iron.**—The pig iron inquiry that is appearing is almost all for moderate tonnages and generally is followed by the indefinite withdrawal of the prospective buyer without purchases being made. Reports of very low prices for Southern iron are common and \$13 is no longer the minimum. Sales are so few, however, that no individual price has any great market significance. The same situation is very largely found in Northern iron and the fact that so many inquiries are withdrawn is perhaps the best evidence that prices are far from being well established. The ability of melters who are known to be using iron at a high rate to remain so long out of the market is a matter for considerable surprise, but as yet no anxiety to cover requirements is in evidence. The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4.....	\$18.00 to \$18.75
Northern coke foundry, No. 1.....	17.50 to 18.00
Northern coke foundry, No. 2.....	17.25 to 17.50
Northern coke foundry, No. 3.....	16.75 to 17.25
Southern coke, No. 1 foundry and No. 1 soft.....	18.35 to 18.85
Southern coke, No. 2 foundry and No. 2 soft.....	17.60 to 18.35
Southern coke, No. 3.....	17.10 to 17.60
Southern coke, No. 4.....	16.85 to 17.10
Southern gray forge.....	16.85 to 17.35
Southern mottled.....	16.35
Malleable Bessemer.....	17.25 to 17.75
Standard Bessemer.....	19.40 to 19.90
Basic.....	17.25 to 17.75
Jackson Co. and Kentucky silvery, 6 per cent.....	20.40
Jackson Co. and Kentucky silvery, 8 per cent.....	21.40
Jackson Co. and Kentucky silvery, 10 per cent.....	22.40

(By Mail)

**Rails and Track Supplies.**—A number of miscellaneous rail inquiries are reported in this market and the leading interest is credited with a sale of 45,000 tons of Bessemer rails to a Western road. There is also a continuance of the inquiry for spikes and track bolts and these materials are moving freely, specifications on contracts being exceptionally heavy. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, \$32 to \$35 net ton; standard section Bessemer rails, Chicago, 1.25c. base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—While the improvement is scarcely perceptible as yet, probably not at all so far as Western mills are concerned, there are indications that the record-breaking shipments from mill are making some headway in advancing deliveries and a gradual betterment in this respect is being anticipated. Contracts for fabricated steel placed during the week were scattering and the total reported aggregated about 2000 tons. The Clinton Bridge Works will furnish 348 tons for a building for Van Allen & Son, Clinton, Ia.; the Virginia Bridge Company of Texas will fabricate 442 tons for the San Antonio & Aransas Pass Railroad; the American Bridge Company will supply 262 tons for the Peter Burritt Building at Elgin and 210 tons for the Coon Rapids Development Company at Coon Rapids, Minn.; the Mead-Morrison Mfg. Company has let contracts for a coal handling bridge and trestle in which there will be 335 tons, of which the Chicago Steel Products Company will furnish 225 tons and the Van Dorn Iron Works 110 tons; the Milwaukee Gas & Light Company placed orders for 353 tons for construction work and T. T. Bent & Sons 123 tons for a store at Oglesby, Ill. We quote for mill shipment, Chicago delivery, 1.63c. to 1.68c.

The demand for structural material from store is especially active in the lighter shapes. For the regular sizes on direct shipment from mill warehouses are promising nothing better than from four to six months' delivery. This is a better delivery, however, than is available from most of the mills. We quote for shipment from store 2.05c.

**Plates.**—The Grand Trunk Railroad has an inquiry in the market for 1000 cars and the Illinois Central is understood to be receiving proposals on the remainder of the 6000 cars for which prices were not taken when that general inquiry was announced. The International & Great Northern is also inquiring for 1000 cars and 10 locomotives, while the Chicago & Western Indiana and the Chicago, Terre Haute & Eastern have each purchased five locomotives. Prompt shipment orders for plates are still placed only at premiums, quotations

approximating 1.78c. delivered at Chicago, the price for mill shipment being 1.63c.

For Chicago delivery from jobbers' stocks we quote 2.05c.

**Sheets.**—A very considerable aggregate of new business in sheets is offering and inquiry from manufacturers and jobbers alike is active. This applies especially to second half business and local mills are very conservative in booking tonnages. There are at the same time a number of the smaller mills quite anxious for tonnage and some shading of prices is noted in this quarter. Some buyers who have not been in the market since the period of low prices last year and are now figuring on new contracts are hesitating in committing themselves at the current high price level. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.08c.; No. 10 blue annealed, 1.93c.

Recent advances of \$3 a ton for special sheets from store are in keeping with the premiums demanded for this material for prompt shipment from mill on new contracts. For other grades of sheets a well distributed demand is noted. For regular sheets out of store prices continue without change as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

**Bars.**—A beginning of contracting by the agricultural implement manufacturing interests for their season's requirements has been made and apparently at regular prices. A policy has been formulated by some of the independent interests looking toward the limitation of contracts to Jan. 1, it being proposed to inaugurate contracts of six-months length rather than from July to July. It is understood that some business has been placed on this basis, but its uniform adoption is already impossible. Bar-iron sales during the week were above the average with prices firm. The demand for reinforcing bars is well under way and it now seems unlikely that adequate tonnage will be available. We quote for mill shipment as follows: Bar iron, 1.57½c. to 1.62½c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

The run on bars and bands from storage is undiminished and many of the warehouse stocks are entirely lacking in certain sizes. Some of the large local stocks are supplying bars for delivery in Pennsylvania and Virginia. The demand for shafting is good, but some irregularity in prices is noted, 51 per cent. off being the top of the market. For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 51 per cent. off.

**Rivets and Bolts.**—New business in rivets is developing slowly and prices are decidedly weak. Quotations as given below are nominal for the most part, concessions of \$2 a ton being the rule. There is likewise but little contracting for bolts. We quote from mill as follows: Carriage bolts up to ¾ x 6 in., rolled thread, 75-10; cut thread, 75-5; larger sizes, 70-2½; machine bolts up to ¾ x 4 in., rolled thread, 70-10-5; cut thread, 75-10; cut thread, 75-5; larger sizes, 70-2½; machine pressed nuts, square head, \$5.70 off per cwt.; hexagon, \$6.30 off per cwt. Structural rivets, ¾ to 1¼ in., 2.38c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ¾ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, \$5.30, and hexagon, \$5.90 off per cwt.

**Wire Products.**—Reports from wire mills indicate some letting up in the rate of production but this is in contrast to shipments which are showing the expected increase customary at this time. Nails and barb wire are being ordered for the retail trade and activity in fencing is augmented rapidly. We quote as follows: Plain wire, No. 9 and coarser, base, \$1.73; wire nails, \$1.93; painted barb wire, \$1.93; galvanized, \$2.33; polished staples, \$1.93; galvanized, \$2.33, all Chicago.

**Cast-Iron Pipe.**—Municipal improvements requiring the larger sizes of cast-iron pipe and correspondingly the work into which the heavier tonnages go, have materialized very slowly. Such lettings as have been made compare very unfavorably with those of a year ago. A large number of small towns are in the market for pipe but these orders are almost exclusively for sizes under 16 in. Milwaukee is in the market for 1000 tons. Prices are soft and we have reduced our quotations 50c. per net ton as follows, Chicago: Water pipe, Water pipe, 4 in., \$29.50; 6 to 12 in., \$27.50; 16 in. and up, \$26.50, with \$1 extra for gas pipe.

**Old Material.**—Supported by a more active buying on the part of the rolling mills in this territory, particularly the East Chicago mills and the Joliet mill, scrap prices show more firmness than in many weeks. The general market will show an advance of about 25c. a ton

for all of the principal grades. Sufficient activity prevailed to offset the influence of heavy selling by the Illinois Central Railroad, which disposed of considerably more than the 7000 tons noted on its recent list. It is understood that the prices obtained were an improvement over the current market. The Northern Pacific is offering about 1200 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	\$16.25 to \$16.75
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 ft.	14.00 to 14.50
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	16.75 to 17.25
Heavy melting steel scrap	12.25 to 12.75
Frogs, switches and guards, cut apart	12.25 to 12.75
Shoveling steel	12.00 to 12.50
Steel axle turnings	10.50 to 11.00

Per Net Ton.	
Iron angles and splice bars	\$15.50 to \$16.00
Iron arch bars and transoms	16.00 to 16.50
Steel angle bars	11.50 to 12.00
Iron car axles	21.00 to 21.50
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.50 to 12.00
Cut forge	11.50 to 12.00
Steel knuckles and couplers	12.25 to 12.75
Steel springs	12.50 to 13.00
Locomotive tires, smooth	13.25 to 13.50
Machine shop turnings	7.75 to 8.25
Cast and mixed borings	6.75 to 7.25
No. 1 busheling	10.75 to 11.25
No. 2 busheling	8.00 to 8.50
No. 1 boilers, cut to sheets and rings	8.75 to 9.25
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	12.50 to 13.00
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	13.00 to 13.50
Agricultural malleable	11.50 to 12.00
Pipes and flues	9.25 to 9.75

B. A. Hegeman, Jr., president U. S. Metal & Mfg. Company, 165 Broadway, New York, announces that James S. Miller, who has represented the company as its Western department manager, scrap-iron department, with headquarters in Chicago, will sever his connection April 1. His successor will be announced at a later date.

The James S. Miller Company, 79 West Monroe street, Chicago, has been organized to engage in the railroad supply and scrap iron business with a capital stock of \$60,000. The incorporators are Harry C. Straus, James S. Miller and Alvin W. Wise.

## Cleveland

CLEVELAND, OHIO, March 18, 1913.

**Iron Ore.**—Vessel tonnage for carrying ore is scarce, vessel men having contracted for about all the capacity they are willing to. Some shippers have been in the market for several weeks for additional tonnage but appear unable to get it at regular prices, and one firm that is figuring on selling a block of 100,000 tons of ore has taken an option on vessel capacity at an advance of five cents over regular rates. Ore firms are well covered for ore already sold, but will have trouble in chartering much additional tonnage and may be compelled to pay higher rates. The supply of labor in the mining districts is more liberal than a few weeks ago, but there are complaints of a scarcity of experienced miners. We quote prices as follows: Old Range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; Old Range non-Bessemer, \$3.60; Mesaba non-Bessemer, \$3.40.

**Pig Iron.**—Prices on foundry grades have declined \$1 a ton in the Valley since the present weakness developed. No. 2 foundry is now quoted at \$16.50, Valley furnace, for last-half delivery and several sales were made at that price within the week. The expected buying movement for the last half has not yet developed. Some of the large consumers are still feeling the market and offers of \$16 for No. 2 have been made for a round tonnage for the last half. While sellers apparently are not ready to make this further concession in price, many believe that the market will be established at \$16 with the sale of some good-sized lots and sellers expect that if the last-half buying movement is started on that basis a fair volume of buying will cause prices to stiffen up to near the recent level. Locally the market is inactive. There is practically no demand for foundry iron for delivery before July, the largest inquiry being from a nearby consumer for 350 tons of No. 2 analysis iron for the second quarter. Southern iron is quiet and weak at \$13 for prompt shipment and the first

half and \$13.25 for the last half. For prompt shipment and for the first half, we quote, delivered Cleveland, as follows:

Bessemer	\$18.15
Basic	\$17.00 to 17.25
Northern No. 2 foundry	17.00 to 17.25
Southern No. 2 foundry	17.35 to 17.60
Gray forge	16.75 to 17.00
Jackson County silvery, 8 per cent. silicon	20.55 to 21.55

**Coke.**—The market is inactive. Prices are stationary and firm. A large share of the consumers of foundry grades have not covered for their last-half requirements. Connellsville furnace coke is quoted at \$2.50 per net ton at oven for prompt shipment and \$2.50 to \$2.75 for contract. Good brands of Connellsville foundry coke are held at \$3.50 for spot shipment and contract.

**Finished Iron and Steel.**—There is considerable inquiry for finished steel for both early and future delivery and specifications on contracts are coming out in good volume. While the local demand appears to be about as heavy as ever a few of the mills are in slightly better shape on deliveries than they were a few weeks ago. Considerable tonnage is being contracted for at 1.40c. for steel bars and 1.50c. for plates and structural material for the last-half delivery. The demand from Ohio tank shops for plates is very heavy. These shops have a great deal of oil-tank work on hand. The structural outlook is promising. Considerable new work is pending and fabricators have a large amount of small work under contract. Some implement makers in this territory are feeling the market on steel-bar contracts, but sellers apparently have not decided whether to make these contracts for a full year or only until January 1. The local forging billet situation is slightly easier, owing to the fact that an Eastern mill can now make deliveries in two to four weeks and is quoting forging billets at \$35, Pittsburgh, or \$1 to \$2 a ton lower than recent prices. Sheets are in good demand and firm. Some sellers are getting a slight premium above regular prices for galvanized sheets for early delivery. Iron bars are firm at from 1.65c. to 1.70c., Cleveland. The warehouse demand continues heavy and jobbers' stocks are still badly depleted. Stock prices are unchanged at 2.10c. for steel bars and 2.25c. for plates and structural material.

**Old Material.**—The market shows little more life than a week ago, but prices are weaker on most grades. The demand, however, is only for small lots. Heavy steel scrap is inactive. The demand for cast borings is fairly good and prices on this grade are slightly firmer, small lot sales being reported at \$7.75. Turnings are a drug on the market and lower in price. Bundled sheet scrap is about the weakest on the list, the price on this having declined about \$1 a ton. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.	
Old steel rails, rerolling	\$14.50 to \$15.00
Old iron rails	16.00 to 16.50
Steel car axles	18.75 to 19.25
Heavy melting steel	12.75 to 13.00
Old carwheels	15.00 to 15.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.50 to 14.00
Light bundled sheet scrap	10.00 to 10.50

Per Net Ton.	
Iron car axles	\$21.00 to \$21.50
Cast borings	7.25 to 7.75
Iron and steel turnings and drillings	6.00 to 6.50
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 1 cast	12.50 to 13.00
Stove plate	9.50 to 10.00
Bundled tin scrap	11.00 to 11.50

## Cincinnati

CINCINNATI, OHIO, March 17, 1913.

**Pig Iron.**—The principal redeeming feature of the situation is the heavy demand for iron on contracts. Shipments are going forward at a satisfactory rate, and in many instances sellers are asked to anticipate deliveries. To a certain extent this condition offsets the extremely dull inquiry. As a rule the furnace interests are playing a waiting game and the price reductions currently reported are confined to resale iron that was bought on a lower market and which the holders could dispose of now at a sacrifice and still make a profit. As has been previously reported, but a limited number of melters have covered for third and fourth quarter requirements. There is also considerable foundry iron that will be needed in the second quarter. Should a buying movement start soon the

**DIESCHER & SONS,**  
Mechanical and Civil Engineers,  
PITTSBURGH, PA.

weak spots might be bridged over, with the result that the market would regain its former strength. It is reported that stocks in the South are now slightly on the increase, but Hanging Rock furnaces are said to be shipping their output about as fast as made. Outside salesmen are simply keeping in touch with their regular customers, but are making occasional sales of carload to 200-ton lots. There is also one recorded sale of about 600 tons of No. 3 foundry iron to a Central Western melter at \$12.75, Birmingham basis, for second quarter shipment. However, it is rumored that several smaller quantities of resale No. 2 foundry iron have been taken at the same figure for spot delivery, but special cash terms were named. The expected inquiry for basic has not yet developed. Malleable is also very dull. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft.	\$16.75 to \$17.25
Southern coke, No. 2 foundry and 2 soft.	16.25 to 16.75
Southern coke, No. 3 foundry	16.00 to 16.25
Southern, No. 4 foundry	15.75 to 16.00
Southern gray forge	15.50 to 15.75
Ohio silvery, 8 per cent. silicon	20.70 to 21.20
Southern Ohio coke, No. 1	17.70 to 18.20
Southern Ohio coke, No. 2	17.20 to 17.70
Southern Ohio coke, No. 3	16.95 to 17.20
Southern Ohio malleable Bessemer	17.20 to 17.45
Basic, Northern	17.70 to 18.20
Lake Superior charcoal	19.25 to 19.75
Standard Southern carwheel	27.25 to 27.75

**Coke.**—Both furnace and foundry coke, in this market, are lifeless. Practically no future contracting is going on and there is only light buying for prompt shipment, confined mostly to the 72-hr. grades. In some quarters it is stated that standard brands of Connellsville furnace coke are held a little firmer and that \$2.40 per net ton at oven is now the minimum on spot shipment material and that contract prices range from \$2.40 to \$2.50. Connellsville foundry coke ranges from \$3 to \$3.50 for either prompt or future shipment, although a few fancy brands are held around \$3.75 per net ton at oven. Wise County and Pocahontas producers are now making about the same quotations as those named for the Connellsville field.

**Finished Material.**—Although new business is not quite so brisk, with the possible exception of structural material, there are enough orders already booked to keep the mills running for some time yet. In fact, the same old question of taking care of customers on time is still a bothersome one. Steel bars are quoted at from 1.40c. to 1.45c., Pittsburgh basis, the latter figure representing the prompt shipment quotation, and structural shapes from 1.45c. to 1.55c. Local warehouses are able to obtain all the way from 2c. to 2.10c. for steel bars and from 2.15c. to 2.20c. for structural material, cut to lengths when desired.

**Old Material.**—The railroads are reported to be offering a large quantity of scrap material, and while there is a steady consumption on the part of both the rolling mills and foundries, it is not increasing. The minimum prices given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum figures are dealers' quotations, f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	\$10.25 to \$10.75
Old iron rails	13.75 to 14.25
Relaying rails, 50 lb. and up.	20.75 to 21.25
Rerolling steel rails	12.75 to 13.25
Melting steel rails	10.75 to 11.25
Old carwheels	12.50 to 13.00
Per Net Ton.	
No. 1 railroad wrought	\$10.75 to \$11.25
Cast borings	6.75 to 7.25
Steel turnings	7.25 to 7.75
No. 1 cast scrap	10.50 to 11.00
Burnt scrap	7.50 to 8.00
Old iron axles	18.00 to 18.50
Locomotive tires (smooth inside)	11.75 to 12.25
Pipes and flues	7.25 to 7.75
Malleable and steel scrap	9.00 to 9.50
Railroad tank and sheet scrap	6.00 to 6.50

## Birmingham

BIRMINGHAM, ALA., March 17, 1913.

None of the concessions made since the entry of resale and Tennessee iron into the market at reduced quotations has apparently produced business. Though quotations and offerings have been lower in the past ten days, actual sales have been of no considerable volume. Small lots were sold around \$13.50, with a premium for special brands, while further inroads on warrants around \$13 are reported. In addition to this some furnace iron has sold as low as the Tennessee or resale offerings. Producers as a rule do not anticipate any great buying movement until the extra session is either over or well under way and the status deter-

mined. A hand-to-mouth buying policy for some time to come is generally predicted. Stocks have increased considerably—from 70,000 tons, the low-water mark, to 120,000 tons being reported. Sales of warrant iron have been made under \$13 and offers at concessions from \$13 have been declined. The furnace companies continue as a rule to hold for 50 cents above resale metal and are apparently as fixed in their waiting attitude as the consumers. Shipments are fully equal to the make and there will probably be no further accumulations this month. Prices f.o.b. cars at Birmingham are as follows:

No. 1 foundry and soft	\$13.50 to \$14.00
No. 2 foundry and soft	13.00 to 13.50
No. 3 foundry	12.50 to 13.00
No. 4 foundry	12.25 to 12.75
Gray forge	12.00 to 12.50
Basic	13.00 to 13.50
Charcoal	25.00 to 25.50

**Cast-Iron Pipe.**—Outside of a prospect of specifications for a 1500-ton pipe order for Minneapolis, the pipe foundries have little to report. For the small sizes of pipe prices are maintained, but orders for larger sizes would bring concessions. The pipe trade follows closely the price of pig iron. Quotations are \$23.50 for 4 in. and \$21.50 for 6 in. and upward.

**Coal and Coke.**—The 1912 output of Alabama coal was not as great as was expected, owing to the scarcity of cars in the late fall. It was 16,513,040 tons against 15,011,863 tons in 1911 and an increase of 500,000 tons over the banner record of 1910. The output of Jefferson County was 8,322,000 tons against 7,964,000 tons in 1911. Advances have been made in the price of steam coal, and domestic coal is ruling higher than this time last year. Coke is strong at the figures ruling for some time, which are from \$3.50 to \$4.25. The entire output is readily in demand.

**Old Material.**—The scrap men have shaded prices and done a good business recently. Among recent transactions are 2000 tons of light steel scrap and 500 tons of relaying rails. All grades are moving more freely as the result of easier prices. Quotations have not been changed, but in actual transactions prices are made to suit the conditions. Quotations are f.o.b. cars at dealers' yards as follows:

Old iron axles	\$15.50 to \$16.00
Old steel axles	15.50 to 16.00
Old iron rails	14.00 to 14.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	10.50 to 11.50
No. 1 country wrought	10.00 to 10.50
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	10.50 to 11.00
No. 1 steel scrap	11.00 to 11.50
Tram car wheels	11.00 to 11.50
Standard car wheels	12.50 to 13.00
Light cast and stove plates	9.00 to 9.50

## San Francisco

SAN FRANCISCO, CAL., March 11, 1913.

Most finished products find a more active demand than for several weeks. The small trade has picked up well after a slight interruption, and merchants' specifications are larger than since the first of the year. Important consumers are also getting into the market for their summer requirements, and large inquiries for special work are more numerous, with indications of a very active season in heavy construction. Distributive trade is still sensitive to weather conditions, and the demand is stronger in the country than locally.

**Bars.**—A much heavier demand for soft steel bars is noted among consuming trades in the country. Merchants' stocks are fair but steadily diminishing, and specifications are coming out more freely. The demand for reinforcing material is strong, with numerous large single inquiries and a heavy volume of smaller business. Local mills find no difficulty in disposing of their output, and some small lots for prompt delivery have been sold at a premium, though manufacturers feel some anxiety over the tariff outlook. Additional inquiries for dam and harbor work are expected shortly. Soft steel bars in jobbing lots are quoted at 2.75c and iron at 2.65c.

**Wire Products.**—Increasing activity is noted in all lines of wire products, the expansion of the lumber industry being reflected in the wire rope trade, while merchants throughout California are putting in liberal supplies of nails and fence material.

**Structural Material.**—While some new work has been taken by local shops, business is by no means active. There is plenty of work on the boards, but few plans are being figured at the moment. The largest job in prospect, the Oakland auditorium, has been awarded to the California Construction Company, which was the only bidder owing to the time limit.



A contract has been let for a small addition to the Bank of Italy, and the Judson Mfg. Company has a contract for the Exposition freight apron. The Central Iron Works has a contract for about 100 tons for the Larsen apartment house at Post and Jones streets. The Llewellyn Iron Works, Los Angeles, has the contract for the Owl Drug Company building at San Diego, and several other contracts are expected shortly in the south. There is nothing new in regard to the subtreasury or the city hall. Plans for the municipal auditorium, this city, are progressing rapidly, and an agreement has been reached regarding the erection of a municipal opera house on the civic center. Plans are under way for a 3-story Class A addition to the Metropolitan Life Insurance building, and the Sather Estate building, Twelfth and Castro streets, Oakland, will be up soon. Local architects will draw plans for a \$180,000 school at Sacramento, Cal. It is announced that steel freight sheds will be built this year at Tacoma, Wash., by the O. W. R. & N. Company. A fair tonnage of plain shapes is still being booked for early delivery on a basis of 1.75c. at mill.

**Rails.**—No exceptionally large orders have been placed, but inquiries are both larger and more numerous than for some time. Mining and logging interests are buying freely for their summer needs, taking mostly light rails up to 50 lb., and the tonnage of heavier sections is satisfactory. Efforts are being made to put through several more municipal railroads, and there is some talk of extending the Ocean Shore line, while several large extensions are being considered in northern California. Plans are under way for a belt line around Los Angeles Harbor.

**Sheets.**—The distributive movement shows no curtailment, and merchants' specifications are increasing, with diminishing stocks. It is believed that all first quarter contracts will be well cleaned up. Some mills appear to be looking for business in galvanized sheets, but it is difficult to fill current requirements in blue annealed and hard red. A considerable tonnage is being booked for third quarter. A notable feature of the consuming demand is the manufacture of smudge pots in southern California, one inquiry for this purpose amounting to 100 carloads, while many smaller orders have been placed. The town of Santa Cruz has taken bids on 10,100 ft. of 10-in. riveted pipe.

**Plates.**—Distributive business is dull, and merchants show little interest, but a substantial tonnage, especially in the lighter weights, is being taken by manufacturers. The Standard Oil Company is preparing to build a distributing plant at Emeryville, Cal., and extensive tank work is projected by several oil interests.

**Merchant Pipe.**—There is a good country jobbing trade, but local business is quiet, and merchants are buying practically nothing. The tonnage in store here is hardly regarded as burdensome, but is not moving off as fast as the holders would like. Oil country business shows a scarcely perceptible improvement. A rumor is out that the Southern Pacific and Santa Fe interests have agreed on the construction of the projected line from Bakersfield to Mojave, but no inquiry for the pipe has appeared in the local market.

**Cast Iron Pipe.**—The movement is still light, nothing of special importance having been booked in the last fortnight, though foundry agents are confident of a good tonnage in the next six months, and several inquiries are expected at any time. The city of Los Angeles has just taken figures on 600 tons, and the town of Lodi will be in the market shortly.

**Pig-Iron.**—Importers are still offering a fair assortment of English and Scotch brands, though supplies are not large and nothing is expected to arrive for about seven months, in view of which prices are fairly steady. There is an easier feeling in domestic grades, and melters are buying only for immediate needs. No. 2 Southern foundry iron is quoted at \$24.10 per gross ton for prompt delivery. It is announced that the electric iron works at Heroult, Cal., will resume operations this week, with two furnaces.

**Coke.**—Spot business is still rather quiet, most melters being fairly well supplied, and there is some foreign coke in importers' hands. A cargo is due to arrive in about 90 days, from which sales are being made at \$13 to \$14 per gross ton, and another cargo is due in about seven months. Spot coke is quoted at \$15.50 per net ton from yard.

**Old Material.**—Desirable scrap of all classes is becoming rather scarce, and prices are firmly held, though so far the situation does not seem to warrant any advance over values which have lately prevailed. No heavy sales have been made this month, but there

is a steady trade. Relaying rails are in especially strong demand, and numerous sales have been closed this week. Prices are as follows: Cast iron scrap, per net ton, \$15.50; steel melting scrap, per gross ton, \$12.50; wrought scrap, per net ton, \$12.50 to \$15; re-rolling rails, per net ton, \$11.

**Metals.**—The steamer Antiochus, loading at Tacoma, Wash., for Oriental ports, is taking 700 tons of copper bars.

The Pacific Coast Steel Company is completing a crane system in its shipping department at South San Francisco, which will effect a great economy in handling. The company has work on its new furnaces well advanced.

## Boston

Boston, Mass., March 18, 1913.

**Old Material.**—The buying movement on the part of the mills noted a week ago has not gained in volume. An increased amount of steel has been sold, but not in large lots. Dealers expect a larger business, which should continue for some time. Prices have not changed. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel .....	\$11.50 to \$11.75
Low phosphorus steel .....	13.50 to 14.50
Old steel axles .....	14.50 to 15.00
Old iron axles .....	22.50 to 23.00
Mixed shafting .....	13.50 to 13.75
No. 1 wrought and soft steel .....	10.75 to 11.00
Skeleton (bundled) .....	9.00 to 9.50
Wrought-iron pipe .....	10.00 to 10.25
Cotton ties (bundled) .....	9.50 to 9.75
No. 2 light .....	4.00 to 4.50
Wrought turnings .....	7.50 to 7.75
Cast borings .....	7.50 to 7.75
Machinery, cast .....	13.50 to 14.00
Malleable .....	10.50 to 11.00
Sieve plate .....	8.50 to 9.00
Grate bars .....	7.50 to 7.75
Cast-iron carwheels .....	15.00 to 15.50

## St. Louis

St. Louis, Mo., March 17, 1913.

There are signs of improvement in pig iron and in scrap material there is no disposition toward further softening. The feeling is that better things are to be expected and there has been no really unsatisfactory condition existing.

**Pig Iron.**—An increased activity in inquiries is noted and while not for large quantities, they have been more numerous than for some time and have also been indicative, considering their sources, of renewed interest. A number of 100-ton lots have been under consideration, one for 100 tons of Southern charcoal iron. There is also an inquiry for 200 tons of Northern charcoal and several for small lots of No. 2 Southern foundry. The movement forward on contracts is still heavy, with no requests whatever that shipments be held up. Sales include one of 1000 tons of charcoal iron, on the inquiry reported last week. Valley basic is reported off, but no sales or quotations have been made here to establish a market.

**Coke.**—There have been no sales of moment, though the movement under contracts has been heavy. By-product coke is held here still on a Connellsville basis. Virginia coke quotations are about 25c. under the Connellsville prices.

**Finished Iron and Steel.**—There is growing interest in steel rails and about 20 miles of standard section for a Kansas interurban is about ready to close. There are several inquiries out for short mileages. Spring activity in rails is believed in this territory to be about to develop into actual business. In structural material the flow of orders continues good and the total tonnage being booked is satisfactory. It could be made larger, according to producers, were they willing to make contracts which the buyers are trying to urge upon them. In bars there has been considerable buying and an evident desire on the part of users to contract ahead. For reinforcing bars there is increased demand, largely due to the nearness of the building season. Business is fair in light rails, the coal roads taking most of those sold.

There is a growing tendency on the part of the lumber roads to take standard section rails. The agricultural and wagon trade continues very busy and urgent in demand for material. Track fastenings are growing more active.

**Old Material.**—A deadly dullness exists, but at that there is no disposition to put further reductions on quotations. No lists appeared this week, and the mills are keeping carefully out of the market. In relaying rails, however, there is a good and increasing inquiry, due to the approach of the spring season. These are now coming from the South and Southwest and considerable of it from lumber lines. Removal of the embargo at the mills is hoped for, but there is nothing in the situation to indicate when this will take place. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$13.00 to \$13.50
Old steel rails, rerolling	14.00 to 14.50
Old steel rails, less than 3 ft.	12.00 to 12.50
Relaying rails, standard section, subject to inspection	22.50 to 23.50
Old carwheels	15.00 to 15.50
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart.	11.50 to 12.00

Per Net Ton.	
Iron fish plates	\$11.50 to \$12.00
Iron car axles	19.50 to 20.00
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	11.25 to 11.75
No. 2 railroad wrought	11.00 to 11.50
Railway springs	10.00 to 10.50
Locomotive tires, smooth	11.50 to 12.00
No. 1 dealers' forge	8.50 to 9.00
Mixed borings	6.50 to 7.00
No. 1 busheling	10.50 to 11.00
No. 1 boilers, cut to sheets and rings	7.00 to 7.50
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	9.75 to 10.25
Agricultural malleable	8.00 to 8.50
Pipes and flues	7.00 to 7.50
Railroad sheet and tank scrap	6.50 to 7.00
Railroad grate bars	7.50 to 8.00
Machine shop turnings	7.50 to 8.00
Bundle sheet scrap	6.75 to 7.25
Wrought arch bars and transoms	14.00 to 14.50
Steel couplers and knuckles	10.00 to 10.50

## British Market Still Apprehensive

Drop in Sheet Bars and  
Squeeze in Speculative Iron  
(By Cable)

MIDDLESBROUGH, ENGLAND, March 18, 1913.

The general tendency is hesitating and the market is affected by reports of trade reaction on the Continent. The squeeze in Cleveland pig iron is increasingly acute. Nearly 100 Welsh tin plate mills have stopped. American tin plate works are reported to be cutting prices for Canada, keeping Welsh makers out. The Steel Corporation has quoted 120s. c.i.f. Wales for semi-finished steel for the last half, but Welsh tin plate bars have sold at 107s. 6d. Stocks of warrant iron are 216,580 tons, against 217,374 tons a week ago. We quote as follows:

Cleveland pig-iron warrants (closing Tuesday), 64s. 8d., against 62s. 10½d. one week ago.

No. 3 Cleveland pig iron makers' price, f.o.b. Middlesbrough, 65s. 3d., against 63s. 6d. one week ago.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 7s. 6d., a decline of 2½s.

German sheet bars, f.o.b. Antwerp, 112s. 6d.

German 2-in. billets, f.o.b. Antwerp, 107s. 6d.

German basic steel bars, f.o.b. Antwerp, £5 17s.

Steel bars, export, f.o.b. Clyde, £8.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 7s. 6d.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yards, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.\*

Steel rails export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s. 10½d. down 3d. from last week and 4½d. from the price of 3 weeks ago.

The Outlook Not Brilliant and Buying Is  
Light—Tin Plates Further Demoralized

(By Mail)

MIDDLESBROUGH, March 5, 1913.

As the cable will have already indicated to you the Cleveland pig-iron market has lately been in a condition closely bordering on demoralization. To appreciate the posi-

tion it must be understood that the later stages of the rise in prices was due to the operations of two leading Glasgow houses, which somewhat late in the day switched their book from the short to the long side, and set about to run the price up to 80s. a ton. As it appears, events turned out unfavorably, what with the war, dear money and an undoubted lull in demand, and the trouble came when one of the parties finding it impossible to clear out on the Glasgow market sent selling orders to several London brokers. Wind of this course soon got about and there was a perpendicular slump of 3s. a ton to a figure 1/6d. below the Glasgow price. Of course denials of all sorts have been put about but the bald fact seems to be that some one wanted to "get out."

The position is certainly not brilliant. One of the largest ore men has just returned from a tour to all the chief consuming centers, undertaken for the purpose of fixing up contracts, and he tells me that all the ore he sold would "go in his hat," and this about expresses the truth. Only last week I heard something the same from a works selling agent who had sent his men to Sheffield to try and sell hematite iron, but their efforts did not bring in a single order. Of course, the tone of buyers may be unduly pessimistic, but the instances cited correctly represent the present general tendency.

The tin plate trade is in a really deplorable condition and what the ultimate outcome will be no man can say. It is estimated that the stocks in private yards and Swansea warehouses today exceed a million boxes—at a conservative estimate. The conference of Welsh makers at Swansea last week was a failure, for about 100 out of the 520 mills voted against a concerted reduction of output, and consequently the projected shutdown must be of a go-as-you-please character. At the time of writing fifty mills are off, and there are more to come, while the market for plates is all to pieces. I have heard of works selling ordinary 20x14 cokes at 13s. 10½d., and even this price may not represent the full extent of the drop which may be sustained, for the trade is in the throes of a crisis.

The Brightside Foundry & Engineering Company, Sheffield, has just completed for the Chrome Steel Works of New Jersey a massive tire rolling mill, which will also be required to deal with very hard steel hoops up to 10 in. wide and from 2 ft. to 10 ft. in diameter. The mill complete weighs 75 tons and will require 600 hp. to drive it. It is built somewhat on the lines of the Collier type of mill, with radial arms for the side rolls, operated through worm and quadrant gear, and the pressure for expansion of the material in rolling is applied by means of a powerful hydraulic cylinder.

## German Weakness More Pronounced

Bars Are Lower and Foreign  
Buying Has Fallen Off

BERLIN, February 27, 1913.

The weaker tendency of the iron market noted for some time has now taken on a more positive form in a reduction of quoted prices. On the Düsseldorf Exchange on Friday German basic steel bars were quoted at one mark lower than previously, namely, at 122 to 125 marks, as compared with 123 to 126 marks; and English No. 3 foundry at 81 to 83 marks, against 85 to 88 marks. The reduction in bars is the first reduction in German official prices for many months. There are further evidences that the situation is gradually growing worse. It is mentioned, for example, that the periods of delivery stipulated by manufacturers are now growing shorter. If things go on as at present it would not be surprising to hear of a shortage of work in some branches by the end of the spring, for market reports point out that there is now almost no new buying.

The Steel Syndicate Shows No Weakness

The Steel Works Union held its monthly meeting today and made no change in prices for semi-finished steel and structural shapes for the next quarter. The survey of the trade situation it gave out was substantially as follows: The employment of the mills is entirely satisfactory, but future developments depend upon the termination of the Balkan war and a resultant relaxation in the money markets. Home business in semi-finished steel is good; both shipments and calls

for delivery were of greater volume than in January. Foreign consumers are still well employed. Nevertheless, there is a reserve in placing new orders, partly owing to the drop in English pig. Shipments of structural shapes for the home trade are satisfactory, but dealers are holding back. No complaint can be made of foreign business, except in the case of the Balkan countries. The Prussian railroads have sent in supplementary orders for material, with an increase of 4000 tons for 1913. The amount of orders on hand February 1 in heavy rails and ties was 490,000 tons greater than at that date in 1912. In grooved and in mining rails business is very good, the works being fully occupied for the rest of the year, and foreign orders have in many cases had to be rejected because the mills were unable to make delivery within the specified periods.

#### General Reports from the Trade

It is mentioned in some of the reports that, while dealers are in a very depressed mood and are placing no new orders, they not infrequently send in urgent calls for delivery of material on contracts, showing that the demand has not utterly ceased. Dear money is spoiling the prospect of a good spring trade, particularly in structural shapes, for the building trades, after having been very dull for a year or two, seem to be in a fair way to repeat that experience this year.

In the Silesian district the rolling mills are reported to be still extraordinarily busy. Two to three months are stipulated for delivery on new orders. Heavy shipments continue to be made from that district to Roumania, but business with Servia and Bulgaria has wholly ceased. It is added that not only are prices fully maintained, but it is even probable that further advances will be made.

In the bar trade considerable irregularity is reported, some of the mills not being so fully employed as several months ago. Periods for delivery are gradually shortening, and new buying has almost ceased. The foreign market, till quite recently a good buyer of bars, is now reported as decidedly holding back with orders, and it is admitted that manufacturers are trying to encourage foreign business by offering concessions. In Luxemburg-Lorraine the bar mills appear to be doing somewhat better than in the Rhenish-Westphalian district. It is said that in the former region 10 to 16 weeks are still stipulated on specifications by the mills, and that they are refusing to cut prices as reached last autumn.

The hardware and machinery trades report business much quieter. Little is doing in builders' and furniture makers' hardware, but in screws and rivets business has hitherto continued good. Solingen reports the cutlery trade very dull. Retailers are buying slowly, having had a poor Christmas trade, and are restricting their orders to immediate requirements. The machine tool shops say that their orders have greatly fallen off this year.

German exports of iron and steel in January amounted to 499,913 metric tons, as compared with 479,749 tons in January, 1912.

#### Later Advices Show No Change

MARCH 6.—The quiet tone previously mentioned has continued, but some buying is still reported. The scarcity of semi-finished steel is still felt embarrassingly in the Silesian district, but in the west this is complained of now in only isolated cases. Nevertheless, the product of the steel mills is everywhere taken by consumers as fast as it can be turned out. No further instances of reduced prices have been reported; the market reviews even point out that manufacturers are holding firmly to prices in nearly all cases. The prospect that the Balkan war will soon terminate and that the general political situation in Europe will then clear up is keeping up the spirits of the producers; they expect an appreciable revival of business after peace has been arranged.

Pig-iron consumption continues heavier than production; stocks at the furnaces, very small for some time, have been further reduced. Foreign business is still being rejected to keep the home trade supplied. At a meeting of the Syndicate about the end of last week a statement was given out that calls for delivery are extraordinarily heavy and that the Syndicate is often unable to meet its engagements. Scrap iron also continues very firm. Buyers absorb readily all that is offered.

Export business in heavy plates remains good, and prices are satisfactory; the mills have orders running far ahead. In thin plates, however, business has grown slacker and prices have weakened to a minimum of 140 marks. The bar trade continues quiet and foreign

buying is also at a slower pace. Iron bars are finding ready sale. Bands are still doing well.

#### Wire and Tubing

Orders for wire rods are still arriving in pretty fair amount and at satisfactory prices. The Rod Association at the end of last week gave out unchanged prices for the June quarter. The existing export drawbacks of 16.50 marks on wire nails and 11.50 marks on wire were continued.

In tubing new business is coming in but slowly, and the volume of orders on the books is being steadily reduced. The export trade is still quite active and prices are good. The boiler and gas pipe makers again held a meeting looking toward the organization of a syndicate for these specialties, but no decision was reached. It is reported that the Mannesmann concern, which has acquired a dominating position in this section of the trade within a year or two and which had hitherto been regarded as the chief obstacle in the way of the projected organization, proposed what was regarded as a suitable basis for it. Another meeting will be held about the middle of the month.

The weakness of the Belgian market has continued. At the end of last week a reduction of the export price of bars by one shilling was reported, making the new price for basic steel bars 117 to 119 shillings; for iron bars, 119 to 121 shillings, and all grades of plate also dropped 1 to 2 shillings. The home price for band iron also dropped. On the other hand, the Belgian Steel Works Association has just given out unchanged prices on semi-finished steel for the next quarter, although a reduction had been looked for in view of the fact that finished products have fallen an average of 5 shillings since the beginning of the year.

## Buffalo

BUFFALO, N. Y., March 18, 1913.

**Pig Iron.**—The market continues inactive and featureless and the general situation appears to have settled down to a further period of slack buying. Uncovered tonnage in foundry grades for second quarter inquired for a while ago is still hanging fire. The few sales reported for the week are for small lots and aggregate considerably less than 5000 tons. Heavy specification on contracts come in uninterruptedly, however, and production is large. All furnaces in this district are in active operation. The stack of the New York State Steel Company, which was out for a short time, has been blown in again. As nearly as can be determined price schedules remain about the same as last week, with a range of \$16 to \$17 on foundry grades, f.o.b. Buffalo, for delivery over remainder of the year. We quote as follows:

No. 1 foundry .....	\$16.75 to \$17.00
No. 2 X foundry .....	16.50 to 17.00
No. 2 plain .....	16.50 to 16.75
No. 3 foundry .....	16.25 to 16.50
Gray forge .....	16.00 to 16.25
Malleable .....	17.00 to 17.25
Basic .....	17.50 to 18.00
Charcoal, regular brands and analysis .....	18.00 to 19.00
Charcoal, special brands and analysis .....	21.75

**Finished Iron and Steel.**—Business now taken by mills on bars is for eight months' delivery. Users holding contracts with the mills are conforming to this situation and placing definite specifications for material to be shipped in the last quarter. Jobbers are reaping the benefit from current trade requirements and the demand for flats, rounds, etc., is so tremendous that jobbers' stocks have been drawn on to depletion, notwithstanding the continued replenishment warehouse stocks have received. The steel passing to buyers now is going into actual consumption, the volume of which is exceedingly large, and no stocks are being accumulated in this district. In wire products large buying is reported with an exceptionally good outlook, and the demand for sheets, both black and galvanized, continues active at firm prices. Fabricated structural material shows growing activity and a large amount of business is coming out for figuring. Bids are being taken this week for steel for garage and delivery depot for the Hoeftler Ice Cream Company, Buffalo, taking 500 tons; for a service building addition to the New York Central Railroad station at Rochester, 140 tons; for an addition to the plant of the Norton Emery Wheel Company, Niagara Falls, requiring a small tonnage, and for a school and assembly hall building for the St. Monica Church, Buffalo, 125 tons. Bids will also soon be received for the Conely Dancing Academy, Buffalo, taking 300 tons of steel and for a



theater for the Columbia Amusement Company, about 500 tons. Plans are being prepared by architects Esenwein & Johnson for a club house for the Order of the Eagles, Buffalo, 250 tons, and for an addition to the Onondaga Hotel, Syracuse, 600 tons. Metz Brothers, Buffalo, are low bidders for the Michaels Theater, Buffalo, 140 tons, and the Eastern Concrete Steel Company, this city, is low bidder for a public school, Sloan, N. Y. (East Buffalo), 100 tons. Bids are in for steel for St. Mary's Parochial School, Dunkirk, N. Y., 170 tons, and for a steel bridge at La Salle, N. Y., 100 tons, for the International Railway Company. Architects Freeburg & Fidler, Jamestown, N. Y., are completing plans for a Masonic temple in that city calling for 200 tons.

**Old Material.**—Demand for heavy melting steel continues good and a much better feeling is noted among dealers as regards almost the entire list of scrap metals. Trade in wrought-iron and soft steel turnings has improved and the price for this commodity has advanced slightly. Increased demand for old carwheels has developed the last few days and other lines are showing more life. Dealers anticipate that scrap material, which has been off in price while new material has been strong, will soon show advancing tendencies. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel .....	\$14.00 to \$14.50
Boiler plate, sheared .....	15.50 to 16.00
No. 1 busheling scrap .....	11.50 to 12.00
No. 2 busheling scrap .....	9.50 to 10.00
Low phosphorus steel .....	17.00 to 17.50
Old iron rails .....	15.00 to 15.50
No. 1 railroad wrought .....	14.00 to 14.50
No. 1 railroad and machinery cast scrap .....	13.75 to 14.25
Old steel axles .....	17.00 to 17.50
Old iron axles .....	24.00 to 24.50
Old carwheels .....	15.75 to 16.25
Railroad malleable .....	13.25 to 13.75
Locomotive grate bars .....	11.00 to 11.50
Stove plate (net ton) .....	9.75 to 10.00
Wrought pipe .....	10.00 to 10.50
Wrought-iron and soft steel turnings .....	7.75 to 8.25
Clean cast borings .....	7.50 to 8.00
Bundled tin scrap .....	18.00

## New York

NEW YORK, March 19, 1913.

**Pig-Iron.**—The business done is largely in piecing-out lots and is not significant of any change in the attitude of buyers toward forward delivery iron. Some foundries apparently needed metal for the next month and in a few cases iron was taken for delivery farther on in the second quarter. The largest lot reported is 500 tons of charcoal iron which will be shipped by all-rail route from Michigan furnace. In coke iron transactions of 100 to 300 tons are reported. Eastern Pennsylvania furnaces have sold No. 2 plain at \$17 at furnace, and this price has also been mentioned in connection with No. 2 X, though most producers are trying to get \$17.25 for this grade. The basis on which basic iron could be bought in eastern Pennsylvania is uncertain, since offers of buyers are much below anything sellers would consider. While \$17.50 delivered is the last authenticated transaction, this price could be bettered considerably from the buyer's standpoint, and probably \$17 could be done. One steel company has been sounding the market. Pipe iron has made up the greater part of the actual recent transactions in the Eastern district. New England foundries have little interest in the market, and there is some evidence of hesitation in the business of machinery manufacturers there in certain lines. We quote as follows for Northern iron at tidewater: No. 1 foundry, \$17.75 to \$18.25; No. 2 X, \$17.50 to \$17.75; No. 2 plain, \$17.25 to \$17.50. Southern iron is quoted at \$17.75 to \$18.25 for No. 1 foundry and \$17.50 to \$17.75 for No. 2.

**Structural Material.**—The views regarding the future are brighter than was the case a week ago, considerable work being considered and the more active closing of contracts continuing. Among the larger buildings likely to be settled in the early future are two printing establishments, one for the Hill Publishing Company, involving 1500 to 2000 tons, and the Hallenbeck building at Franklin, Lafayette and White streets, involving about 3500 tons. Bids have gone in for 500 tons for Erie barge canal bridges; the Boston & Albany is to build a station and extension to a freight house at Pittsfield, Mass., involving 400 tons; bids have been asked for a rolling lift highway bridge at South Norwalk, 400 tons; the Pennsylvania Railroad has about 1000 tons of bridge work pending and it is understood that the New York Central is planning some extensive bridge replacement and reinforcement, which will run into a heavy tonnage. The Erie is in the market for three bridges totaling 75 tons.

Recent contract awards include the following: 1000 tons for the Lehigh Valley to the American Bridge Company, which is also to supply the 1000-ton structure for the Utica station of the New York Central and 400 tons for a pier at Weehawken for the West Shore; 230 tons for a power house at Augusta, Ga., and 300 tons for power house at Parr, S. C., both to the Noelke-Richards Iron Works; 1100 tons for a garage, West Sixty-first street, for the Locomobile Company of America to Harris Silvers Baker Co.; 460 tons for the Brewster building, Spartanburg, S. C., to the Roanoke Bridge Company, which also has taken a 100-ton contract for girder spans for the Virginian Railroad; 220 tons for the Rhode Island stone bridge at Tiverton, R. I., to the Pennsylvania Steel Company, and 250 tons for a power house for the Central Railroad of New Jersey to the Phoenix Iron Company. The Virginia Bridge & Iron Company is to supply 3250 tons of the Norfolk & Western work and the Catasauqua bridge of the Central Railroad of New Jersey, given to the American Bridge Company, will require 770 tons. Some 300 tons for a machine shop at Lowell, Mass., has also been closed. Generally fabricators are in need of more work, and prices of material erected are still showing the signs of recent quietness. Quotations for plain materials are 1.61c. to 1.66c., New York, for mill shipments in the third quarter; 1.76c., New York, for delivery in four to twelve weeks, with \$2 a ton additional for prompter shipment, and for lots from store 2.15c., New York.

**Plates.**—Demand has not quickened but Eastern mills do not seem to have caught up to any extent in the matter of deliveries and three or four more weeks are required for the relatively prompt business. No cars have been bought since the last report, except some passenger equipment, and in fact the inquiry for 1000 stock cars for the Missouri, Kansas & Texas has been cancelled. The Pennsylvania bought 307 passenger equipment cars, 110 from the American Car & Foundry Company, 105 from the Pressed Steel Car Company and 92 from the Standard Steel Car Company. Quotations remain at 1.61c. to 1.66c., New York, for mill shipment in the third quarter and 1.76c. for shipment in one month or more with \$1 a ton additional for universal plates.

**Bars.**—Recurring signs of weakness are discernible in bar iron, prices of 1.50c. to 1.60c. at the mill being mentioned though as high as 1.70c. at the mill seems also to be held. The volume of orders has gradually been diminishing in recent weeks though it is still of good proportions. One mill takes the view that the decrease in present buying marks altogether a healthy change. No new condition is noted in steel bars, some sizes of which are obtainable in two to three months while others cannot be obtained before the last month or two of 1913. While New York store prices remain at 2.05c. for steel bars, it is learned that steel from the warehouse has in Baltimore gone for 1.90c. One inquiry in the market calls for 1500 tons of light angles for early shipment. Steel bars are quoted at 1.56c., New York, delivered at the convenience of the mill, which is commonly more than three months hence, with reinforcing bars perhaps easier to get than others. Refined iron bars are 1.65c. to 1.80c., New York. Store prices are for steel bars, 2.05c.; for iron bars, 2.10c. Prices of bar iron products are not firmly held.

**Cast-Iron Pipe.**—Woburn, Mass., will open bids on 450 tons March 21. Private buying has latterly been on the increase. Inquiries and orders are satisfactory to manufacturers. Rather significant incidents are occurring, however, as showing a tendency among buyers to greater conservatism. Inquiries promising large purchases are prone to resolve themselves into the purchase of small lots, because of the less buoyant outlook. Prices of carload lots of 6 in. are continued at \$24 to \$25 per net ton, tidewater.

**Ferroalloys.**—Although leading sellers of 80 per cent. ferromanganese continue to quote \$65, Baltimore, for any delivery, and sales of carload lots have been made at that price, there have been offerings of resale lots of spot down to \$64 and the market is a little weaker in consequence. Demand is quiet. In 50 per cent. ferrosilicon there is no change, and very little is doing with quotations remaining at \$75, Pittsburgh, for carloads. \$74 for 100 tons and \$73 for 600 tons and over.

**Old Material.**—While quotations are maintained, the volume of business has somewhat disappointed expectations. It had been expected that the interest manifested among buyers last week was a harbinger of a considerably improved demand, but this has not materialized. Some buying has been done, but it would

appear that large consumers have largely supplied themselves for the time being by purchasing directly from railroad companies. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$11.00 to \$11.50
Heavy melting steel scrap .....	11.00 to 11.50
Relaying rails .....	22.00 to 22.50
Revolving rails (nominal) .....	14.00 to 14.50
Iron car axles .....	24.00 to 24.50
Old steel car axles .....	16.00 to 16.50
No. 1 railroad wrought .....	13.50 to 14.00
Wrought-iron track scrap .....	12.75 to 13.25
No. 1 yard wrought, long .....	11.50 to 12.00
No. 1 yard wrought, short .....	11.00 to 11.50
Light iron (nominal) .....	4.50 to 5.00
Cast borings .....	7.25 to 7.75
Wrought turnings .....	7.50 to 8.00
Wrought pipe .....	10.25 to 10.75
Old carwheels .....	14.50 to 15.00
No. 1 heavy cast, broken up .....	11.25 to 11.75
Stove plate .....	8.75 to 9.25
Locomotive grate bars .....	8.00 to 8.50
Malleable cast .....	11.00 to 11.50

## Metal Market

NEW YORK, March 19, 1913.

### The Week's Prices

Cents Per Pound for Early Delivery.

Mar.	Lake.	Copper, New York.		Lead		Spelter	
		Electro-lytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
13.....	15.00	14.87½	45.85	4.35	4.20	6.40	6.25
14.....	15.00	14.87½	45.95	4.35	4.20	6.40	6.25
15.....	15.00	14.87½	.....	4.35	4.20	6.40	6.25
17.....	15.00	14.87½	45.70	4.35	4.20	6.40	6.25
18.....	15.00	14.87½	46.00	4.35	4.20	6.30	6.15
19.....	15.00	14.87½	45.87½	4.35	4.20	6.30	6.15

Copper is lower, with the market inactive. The demand for tin futures has been fairly steady, but prices are lower. Lead is quiet, but its price is maintained. Spelter has lost some of its recent gain. Antimony is weak and sales are small.

### New York

**Copper.**—The market has been dull and appears to be drifting back to the nominal and unsatisfactory condition which has prevailed so much in recent months. Although there has been but little trading, there has been enough at 15c. cash for Lake and 14.87½c., cash, New York, for electrolytic to establish these quotations as the market level, despite the fact that probably they could be shaded a little. Prompt delivery copper is somewhat scarce, but there is enough to go round, as several companies can make quick deliveries if called upon to do so. Up to the present there are no reports of any heavy buying on the part of Europe, although exports for this month reach the very fair total of 21,423 tons. The quotations in London to-day are £64 5s. for spot and £64 11s. 3d. for futures.

**Pig Tin.**—Conditions have continued practically the same as stated in last week's report, although the demand for spot has improved slightly. There continues to be a fair demand for futures and rather good sales have been made almost every day, although many of the transactions have been between dealers. The supply of tin for March will be liberal, it now being figured that 7350 tons will be available for consumption, and inasmuch as deliveries are estimated not to exceed 5000 tons a good-sized margin in the way of stocks will be left April 1. There is now in the port of New York what is probably the largest quantity of Chinese tin ever here at any one time. The steamship Swazi arrived March 13 with 200 tons of Chinese tin aboard and the Schuykill March 17 with 120 tons. This metal runs 97 to 99½ per cent. pure and the high grades are available for almost any use to which tin is put. Tin is still selling here at below the import cost. It is quoted to-day at 45.87½c., New York. The London quotation to-day is £209 10s. for spot and £206 for futures. The arrivals this month have been 4340 tons and there is afloat 3185 tons.

**Lead.**—The market has continued quiet and dull but has maintained its undertone of strength. Lead is perhaps in the best position of any of the metals. As previously pointed out the greatest restraining influence is the approaching tariff legislation. The New York price is 4.35c. and that in St. Louis 4.20c.

**Spelter.**—After activity at 4.25c., St. Louis, in which a large quantity of spelter was taken by consumers, the market lost part of its strength and declined 10 points as a result of competition which came with the flurry of demand. The New York price is now 6.30c. and that in St. Louis 6.15c.

**Antimony.**—Many sellers of antimony declare the market to be most unsatisfactory and they are inclined to withdraw from it rather than press sales. They assert that the metal is now being sold, at least by some dealers, at figures actually below cost. Cookson's is quoted at 9c., Hallett's at 8.50c. and Chinese and Hun-

garian grades at 7.62½c. to 7.75c. The trading has been in small lots only.

**Old Metals.**—The demand is moderately good, with dealers' selling prices unchanged, as follows:

	Cents per lb.
Copper, heavy and crucible .....	14.25 to 14.50
Copper, heavy and wire .....	13.75 to 14.00
Copper, light and bottoms .....	12.75 to 13.00
Brass, heavy .....	9.25 to 9.50
Brass, light .....	7.75 to 8.00
Heavy machine composition .....	12.75 to 13.00
Clean brass turnings .....	8.50 to 8.75
Composition turnings .....	11.00 to 12.00
Lead, heavy .....	4.00
Lead, tea .....	3.75
Zinc, scrap .....	5.25

### Chicago

MARCH 17.—Metal buying the past week was steady and totaled a fair tonnage, but was without special feature. Tin prices are somewhat easier. Spelter values continue to show a stronger tone and quotations are slightly higher. Other metal prices are practically unchanged from the quotations of a week ago. We quote as follows: Casting copper, 15c.; Lake, 15.50c., in carloads for prompt shipment; small lots, 14c. to 14½c. higher; pig tin, carloads, 47c., small lots, 49c.; lead, desilverized, 4.30c. to 4.35c. for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.30c. to 6.35c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc is \$8.25, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 13c.; copper bottoms, 11.75c.; copper clips, 12.75c.; red brass, 12c.; yellow brass, 9c.; lead pipe, 3.80c.; zinc, 4.50c.; pewter, No. 1, 33c.; tinfoil, 37c.; block tin pipe, 44c.

### St. Louis

MARCH 17.—Lead has remained firm at 4.22½c., but spelter has advanced slightly to 6.20c. Copper is better at 15.37½c. to 15.72½c. for Lake and 15.35c. to 15.60c. for electrolytic. Tin is off to 45.22½c. and Cookson's antimony is also lower at 9.35c. Business has been fair. In the Joplin ore market high grade zinc ore was in strong demand, the top price for the choicest lots being \$53 per ton. The prevailing basis price for zinc blende was from \$46 to \$50 per ton. Buyers of the choicer ores found it difficult to get their required tonnage, while the purchasers of second grades were not so prominent in the market. The district is producing about 4500 tons weekly now, an increase of about 1000 tons. The price of calamine remains firm at \$25 to \$27 for 40 per cent., while the choicest lots brought as high as \$33. Lead ore showed no change, being quoted at \$53.50, with the better grades bringing \$54. In miscellaneous scrap we quote as follows: Light brass, 5.50c.; heavy brass and light copper, 9c.; heavy copper and copper wire, 11c.; zinc, 4c.; lead, 3.50c.; tea lead, 3c.; pewter, 25c.; tinfoil, 34c.

## Iron and Industrial Stocks

NEW YORK, March 19, 1913.

No general movement has occurred since last week's review. The International Steam Pump stocks declined because of reports in circulation regarding the diminished earnings of the company. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can. com.....	31½-33½	Lackawanna Steel.....	44
Am. Can. pref.....	120-122½	Nat. En. & St. com.	14-14½
Am. Car & Fdy. com.	48½-50½	Pressed Steel, com.	25½-26½
Am. Car & Fdy. pref.	114½-114¾	Pressed Steel, pref.	97-97½
Am. Loco. com.....	35-36½	Railway Spring, com.	27-28
Am. Loco. pref.....	104¾-105	Railway Spring, pref.	98-98½
Am. Steel Foundries	33-35	Republic, com.....	24½-25
Bald. Loco. com.....	47-47½	Republic, pref.....	85½-87
Bald. Loco. pref.....	104-104½	Rumely Co., com.....	55-66½
Beth. Steel, com.....	34-36¾	Rumely Co., pref.....	89¼-91
Beth. Steel, pref.....	69-70	Sloss, com.....	34½
Case (J. I.), pref.....	101-101½	Pipe, com.....	13½
Colorado Fuel .....	32½-34	Pipe, pref.....	53-53½
Deere & Co., pref.....	97¾-98½	U. S. Steel, com.....	59½-61½
Emer-Brant, com.....	52	U. S. Steel, pref.....	107¾-108
General Electric.....	137-138½	Va. I. C. & Coke.....	50
Gr. N. Ore Cert.....	34-36	Westinghouse Elec.	65½-69
Int. Harvester, com.	104½-106½	Chic. Pnen. Tool....	49-49½
Int. Harvester, Pref.	111½	Combria Steel.....	50½-51½
Int. Harvester, Corp.	105½	Pa. Steel, pref.....	92
Int. Harv. Corp. pref.	113	Crucible Steel, com.	15½-15¾
Int. Pump, com.....	8-10½	Crucible Steel, pref.	93½-94½
Int. Pump, pref.....	40-43½	Harb. Walk Ref., pref.	101¾
La Belle Iron, com.....	44-45		

### Dividends Declared

The J. I. Case Threshing Machine Company, regular quarterly, 1¼ per cent. on the preferred stock, payable April 1.

The Otis Elevator Company, regular quarterly, 1 per cent., on the common and  $1\frac{1}{2}$  per cent. on the preferred stock, payable April 15.

The Union Switch & Signal Company, regular quarterly, 3 per cent. on both the common and preferred stock, payable April 10.

The Gillette Safety Razor Company, regular quarterly,  $1\frac{3}{4}$  per cent. on the preferred and  $1\frac{1}{4}$  per cent. on the common stock, payable April 15.

The United Shoe Machinery Company, regular quarterly,  $1\frac{1}{2}$  per cent. ( $37\frac{1}{2}$  cents per share) on the preferred stock, and 2 per cent. (50 cents per share) on the common stock, payable April 5.

The Continental Can Company, initial dividend of 21-3 per cent. on the preferred stock for period from December 1, 1912, to April 1, 1913, being at rate of 7 per cent. per annum, payable April 1.

The American Brake Shoe & Foundry Company, quarterly, 2 per cent. on the preferred stock, an increase of  $\frac{1}{4}$  of 1 per cent. quarterly, and regular quarterly,  $1\frac{3}{4}$  per cent. on the common stock, both payable March 31.

The Pettibone-Mulliken Company, regular quarterly,  $1\frac{3}{4}$  per cent. on the preferred stock, payable April 1.

The Walworth Mfg. Company, regular quarterly, 3 per cent., payable March 21.

Manning, Maxwell & Moore, Inc., regular quarterly,  $1\frac{1}{2}$  per cent., payable March 31.

The American Seeding Machine Company, regular quarterly,  $1\frac{1}{2}$  per cent. on the preferred and 1 per cent. on the common stock, payable April 15.

The International Harvester Company of New Jersey, quarterly,  $1\frac{1}{4}$  per cent., payable April 15. This is the first dividend declared by the new company.

The International Harvester Corporation, quarterly,  $1\frac{1}{4}$  per cent., payable April 15. This is the first dividend declared by the corporation organized to take over the foreign companies of the old International Harvester Company.

The Yale & Towne Mfg. Company, regular quarterly,  $1\frac{1}{2}$  per cent. and an extra dividend of 1 per cent., payable April 1.

The Boston Belting Company, regular quarterly, \$2, payable April 1.

The Westinghouse Air Brake Company, regular quarterly, 2 per cent., an extra of 2 per cent. and a 5 per cent. stock dividend, all payable April 15.

The American Iron & Steel Mfg. Company, regular quarterly,  $1\frac{1}{4}$  per cent. on the preferred and common stocks, payable April 1.

The Sloss-Sheffield Steel & Iron Company, regular quarterly,  $1\frac{3}{4}$  per cent. on the preferred stock, payable April 1.

The Union Typewriter Company, regular quarterly,  $1\frac{3}{4}$  per cent. on the first preferred and 2 per cent. on the second preferred stock, payable April 1. No action was taken on the common dividend.

The Brier Hill Steel Company, regular quarterly,  $1\frac{3}{4}$  per cent., payable April 1.

The Independent Pneumatic Tool Company, Chicago, manufacturer of Thor air tools, regular quarterly,  $2\frac{1}{2}$  per cent., payable April 10.

The Dominion Iron & Steel Company, regular semi-annual,  $3\frac{1}{2}$  per cent. on the preferred stock, payable April 1.

The Dominion Steel Corporation, regular quarterly, 1 per cent. on the common stock, payable April 1.

F. H. Sleeper, designer and builder of machinery for making wire forms, 98 Beacon street, Worcester, Mass., announces that he has entered into partnership with George D. Hartley, and that in the future the business will be conducted under the name of Sleeper & Hartley at the same address. The firm will design and build for the trade improved automatic wire spring making machinery and automatic wire forming machines to handle wire forms of the most complex kind. Mr. Sleeper has been engaged in this line of work for more than 25 years, and in that time has designed and built more than 260 different successful machines. Mr. Hartley, also a mechanical engineer, has been for many years connected with the typographical industry as designer and patent expert and patent attorney, and has designed some very complicated typographical machines.

The Syracuse Smelting Works, 147 to 153 Jewell street, Brooklyn, N. Y., is completing an important addition to its plant. The company manufactures Stanley process babbitt and white metals.

## Personal

Frank P. Case, formerly district sales manager at Chicago of the Braeburn Steel Company, Pittsburgh, has been made general sales manager, with headquarters at Braeburn, Pa., where the works are located, and A. G. Phelps has been appointed district sales manager at Chicago. Victor F. Schafer has been appointed to take charge of the new sales office recently opened by the company in the Connecticut Mutual Life Insurance Building, Hartford, Conn.

C. R. Dimm, formerly connected with J. K. Dimmick & Co., coal, coke and pig-iron merchants, is now associated with the W. A. Stone Company, manufacturer and miner of coke and coal, 807 Stephen Girard Building, Philadelphia, Pa.

W. F. Rust, chief engineer of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has been appointed general superintendent of works of the Otis Steel Company, Cleveland, Ohio.

A. M. del Valle e Yznaga, representative in Cuba of the Cresson-Morris Company, Philadelphia, has returned from Cuba for a short visit. The company is about to open an office in Havana for the handling of its sugar and transmission machinery business.

P. Goutard and F. de Borniol, of the Creusot works of Schneider & Co., France, who have been in this country five weeks visiting a number of machine tool works, are scheduled to sail for home March 20.

Prof. Ira N. Hollis, professor of engineering at Harvard University since 1893, has accepted the presidency of the Worcester Polytechnic Institute, Worcester, Mass., and will enter upon his new work July 1. He will succeed Prof. L. L. Conant, who has been the acting president since the resignation of President Edmund A. Engler early in 1911.

LeRoy Gordon has been appointed manager of the New York office of the Nelson Valve Company and Yarnall-Waring Company, room 301, 30 Church street. Irving N. Beeler has been appointed district sales manager for central New York for the same companies, with office at 218 Bastable Building, Syracuse.

Edgar N. Easton has associated himself with the railroad sales department of Joseph T. Ryerson & Son, with headquarters at New Haven, Conn. John H. Craigie, formerly with the mechanical department of the Boston & Maine Railroad, has also become associated with the railroad sales department of Joseph T. Ryerson & Son, with headquarters at Boston, Mass.

Ed. Brand, specialist in wire machinery, has removed from Manchester to more convenient premises at 96 Victoria street, Westminster, London, S. W., England. The removal has been necessitated by the increasing demands of his business on the continent of Europe, in America and the English colonies, and also in the Far East. He requests a visit from his American friends when they have occasion to be in London.

H. G. Dalton, of Pickands, Mather & Co., Cleveland, Ohio, has been elected a director of the Lackawanna Steel Company, succeeding Stephen S. Palmer, deceased. Other directors whose terms expire this year were re-elected as follows: Horace E. Andrews, James A. Campbell, B. S. Guinness, Adrian Iselin, Jr., John J. Mitchell and Cornelius Vanderbilt.

Dudley R. Kennedy has been appointed special agent of the Youngstown Sheet & Tube Company, Youngstown, Ohio, succeeding the late Arthur R. Foster.

P. O. Geier, treasurer Cincinnati Milling Machine Company, Oakley, Ohio, has returned from a month's pleasure trip to Panama, Cuba and other Central American countries.

C. H. M. Atkins, president Warner Elevator Company, Cincinnati, Ohio, spent the month of February visiting Cuba and Jamaica.

Charles McGonigle, for the past eight years designing and contracting engineer for Milliken Brothers, Inc., has opened an office as consulting structural engineer at 815 Chamber of Commerce Building, Portland, Ore.

James T. Castle, effective April 1, will resign his position with the Buckeye Engine Company, Salem, Ohio, to become manager of the Pittsburgh office of the Pittsburgh-



Merzer Automobile Company, Trenton, N. J., and the Jackson Automobile Company, Jackson, Mich.

E. P. Douglass, Frick Building, Pittsburgh, has been elected president of the Blake Crusher & Pulverizer Company, succeeding John E. Blake, who died March 7.

## Obituary

Dr. F. W. C. Schniewind

Dr. F. W. C. Schniewind died at his residence in Englewood, N. J., March 12, following an operation for appendicitis about two weeks prior to that time. He was born at Bochum, Westphalia, Germany, October 23, 1861. He received the degree of Ph.D. at Heidelberg University, and having been educated as a chemist he took up work in the iron and steel branch in Germany. He came to America about the age of 28 years and pursued similar work in the West. He then located for a short time at Cleveland, Ohio, and eventually became interested in the introduction of by-product coke ovens in America, representing the well-known firm of Dr. C. Otto & Co., Dahlhausen, Germany. The patent rights of the firm in America were secured by the Otto Coke & Chemical Company, incorporated in the early 90's to introduce coke ovens of the Otto type in America. His activities were mostly with the company which was next incorporated, namely, the United Coke & Gas Company.

The chief work in which Dr. Schniewind was a pioneer was the adaptation of the by-product coke oven for the manufacture of illuminating gas as carried out in the large plant of 400 ovens built at Everett, near Boston, Mass., about 1898. At the time of his death he was president of the German-American Coke & Gas Company and its subsidiaries—the United Coke & Gas Company and the American Coke & Gas Construction Company. Since August last he has been the sole owner of these companies. He also was president of the Schniewind Coke Oven Company, incorporated last January. He wrote numerous articles for technical papers which attracted much attention and had wide circulation. His paper before the International Engineering Congress at Glasgow in 1901 entitled "Production of Illuminating Gas from Coke Ovens" is still in demand. Although born in Germany, he had exceptional command of the English language, as is evidenced by the exactness with which he used it. He was a member of the following societies: Inventors' Guild, Franklin Institute, Engineers' Club, Chemists' Club, Deutscher Verein, Whitehall Club, American Gas Institute, Englewood Club, Verein Deutscher Ingenieure, Deutsche Chemische Gesellschaft, Verein Deutscher Eisenhüttenleute, Germanistic Society, Society of Chemical Industry, American Institute of Mining Engineers, American Society of Testing Materials, Illuminating Engineering Society, American Forestry Association, National Commercial Gas Association, Deutscher Verein fuer Gas u. Wasserfachmaenner, Technischer Verein von New York, Verein Deutscher Chemiker, American Museum of Natural History, New York Zoological Society, National Geographical Society, Weinheimer Alter Herren Vereinigung, American Association for Advancement of Science.

Dr. Schniewind was deeply interested in every phase of his subject, and it is stated that his library hardly has its equal in America when considering the coke and gas field. He leaves a widow and two sons. His remains were taken to Cleveland, Ohio, for interment.

THOMAS H. JEWELL, superintendent of rolling mills of the Wisconsin Steel Company, died March 4 at his residence in Chicago, after a short illness, aged 71 years. He was born in England. The death of his father compelled him to take up the burden of self-support at the age of 8 years, when he started to work in an English coal mine. At the age of 13, in company with his mother and only brother he came to Troy, N. Y., where within two weeks after arrival both his mother and brother were stricken with cholera and died, leaving him alone to fight life's battles, which he bravely undertook by entering the rolling mills there. Then began his relation to the iron and steel industry which lasted until his death. From Troy he went to Cleveland, then to Michigan and later to Chicago. He was present at the making of the first Bessemer steel, on a commercial basis, in America, in the fall of 1864 at Wyandotte, Mich. He was superintendent

of the rolling mills of the Wyandotte plant for several years, going from there to Chicago, where he took charge of mills controlled by the company that also operated at Wyandotte. He was superintendent of the rail mill of the Union works when it was producing record tonnages. His term of service with the different companies in the Chicago district which later formed the Illinois Steel Company covered a period of 40 years. He left the Illinois Steel Company to go with the Wisconsin Steel Company at South Chicago, and at the time of his death had been for 12 years in the capacity of superintendent of rolling mills.

LOUIS H. SHOLDER, owner and manager of the Cleveland Lock Company, Cleveland, Ohio, died March 16, age 63 years. He established the company of which he was the head 25 years ago.

## Pittsburgh and Vicinity Notes

The Riter-Conley Mfg. Company, Pittsburgh, is operating its works at Leetsdale, Pa., on full time and shipping about 10 carloads of material per day. Among contracts recently received is one from the city of Baltimore for 2464 ft. of riveted steel pipe made of 7/16-in. plates, aggregating about 1500 tons, to be used in piping water. For the Armstrong Cork Company, Lancaster, Pa., three oil tanks, 35 ft. in diameter and 35 ft. high, are being built. Retort houses are under construction for the Rockford Gas Light & Coke Company, Rockford, Ill., and the Philadelphia Suburban Gas & Electric Company, Chester, Pa.

Among recent orders received by the Westinghouse Electric & Mfg. Company, East Pittsburgh, were several from large operating companies for turbo-generator units of great size. The aggregate of these orders amounts to over 208,000 hp., sufficient to keep the shops busy for some time to come. A number of these units are to be located in the Pittsburgh district. They run from 12,500 to 21,000 kva.

The Wiener Machinery Company, 50 Church street, New York City, sole representative of Oeking solid steel punches, plate and angle shears, and of S. & N. heavy duty beam shears, coping machines and double angle shears, has opened a branch office at 1009 Hartje Building, Pittsburgh.

The new 8-in. mill at the Brown-Bonnell works of the Republic Iron & Steel Company at Youngstown, Ohio, was put in operation on Tuesday. It will roll hoops and bands.

The Pennsylvania Engineering Works, New Castle, Pa., states that as soon as the weather permits it will proceed to complete the erection of the blast furnaces for the Minnesota Steel Company. It is actively pushing construction on a new blast furnace for the Bethlehem Steel Company, work in the shops having been under way for several months, and is also building a 1000-ton mixer for the same corporation. An order has just been received to build a mixer of the same size for Corrigan, McKinney & Co., Cleveland, Ohio.

At Warren, Pa., the Gisholt Machine Company has purchased additional land adjoining its plant and has plans in preparation for extensions which will be made at once. Work has been commenced on an extensive brick addition to be made to the factory of the Conewango Furniture Company. The Allegheny Foundry Company has plans in progress for a substantial addition to be made to the plant and equipment of its steel car department. The Warren Table Company is building a three-story addition to its works. Plans are under consideration for a large addition to be made to the plant of the Hammond Iron Works. The Struthers-Wells Company is getting out drawings for a flange department building and will commence construction as soon as plans are finished. The Protective Account Company, one of the latest industries to locate in Warren, is preparing plans for the erection of a manufacturing plant to cost approximately \$25,000.

The Asbestos Protected Metal Company, Beaver Falls, Pa., has acquired additional land adjoining its main plant and lying between the main lines of the Pennsylvania Railroad and the Marginal Railroad. A special steel treating plant, a storage building and a new single-story steel and concrete factory for the manufacture of architectural roofing tiles and asbestos shingles have been planned to take care of the rapidly increasing business. Special machinery of the company's own design and manufacture will be

installed. Details of the power equipment and heating apparatus have not yet been announced.

The Manufacturers' Association of Pittsburgh will remove its offices about April 1 from the Lewis Block to rooms 504-506 Second National Bank Building, Pittsburgh.

The Pittsburgh Cold Rolled Steel Company, Pittsburgh, has increased its capital stock from \$50,000 to \$150,000. The company states that it has no plans for extensions under way at present.

The Standard Steel Car Company of Pittsburgh is enlarging its plant at New Castle, Pa., by an addition of 200 ft. to the main building of the wooden car department.

The John F. Robertson Company, steel specialties, Park Building, Pittsburgh, has been appointed agent in the Pittsburgh district for the Roto Company, Hartford, Conn., manufacturer of Roto-turbine cleaners.

The annual report of the Pittsburgh Coal Company gives gross earnings for the year ended December 31, 1912, at \$4,427,063, against \$4,044,504 in 1911. Net earnings increased over \$600,000. Total surplus at the close of 1912 was \$9,153,434, against \$8,481,541. Chairman M. H. Taylor says that the outlook for 1913 is for material increase in net earnings.

The Lockhart Iron & Steel Company, one of the oldest manufacturers of bar iron in Pittsburgh, recently bought about nine acres adjacent to its plant at McKees Rocks, which gave rise to the report that extensive additions were to be made. The company states, however, it has no such plans at this time, but will use the ground acquired for extending its crane service for the better handling of materials and for increasing its yard room. It will not be in the market for any new cranes or for any other equipment.

The Latrobe Electric Steel Company, Latrobe, Pa., has been organized with a capital stock of \$300,000 to engage in the manufacture of manganese steel castings, which will be made by the electric process. The company will install a Heroult electric furnace, the output to be 30 to 35 tons per day. The plant will be located near the works of the Vanadium Alloys Steel Company at Latrobe. Marcus Saxman is president, Charles W. Gutzzeit vice-president, F. B. McFeeley secretary, and Ira B. Shallenberger, treasurer.

The Duquesne Light Company, Pittsburgh, will increase the capacity of its power house on Brunots Island by the installation of turbines of 98,000 hp. The first turbine is to be installed about November 1 and the second December 1. The present capacity of the plant is 34,000 hp.

The Alliance Machine Company, Alliance, Ohio, has sold to the Cambria Steel Company, Johnstown, Pa., two 15 and two 20 ton electric cranes.

The Alliance Machine Company, Alliance, Ohio, has received contracts from the Wisconsin Steel Company for one 15-ton 81-ft. span crane, for merchant mill No. 4; one 15-ton 115-ft. span double hoist for merchant mill No. 2; one 10-ton 32-ft. 2-in. span crane for the powerhouse; from the Aluminum Company of America for six 6-ton cranes, 40-ft. span, and two 5-ton cranes, 76-ft. span, all mill type, for the new plants at Knoxville, Tenn., and Massena, N. Y., and from the Jones & Laughlin Steel Company for a 30-ton trolley for Aliquippa, Pa.

Press reports that the Westinghouse Air Brake Company would remove its plant from Wilmerding to Erie, Pa., are officially denied. It was incorrectly stated that the Pennsylvania Railroad intends to electrify its road from Pittsburgh to Greensburg, Pa., a distance of 31 miles, and that it would take the Westinghouse shops at Wilmerding for machine shops in which to make the necessary equipment for such electrification. The Air Brake Company will build a new two-story foundry at Wilmerding, Pa., 60 x 300 ft. Two 5-ton and two 1-ton electric traveling cranes will be in the equipment to be installed.

The Page Woven Wire Fence Company has about finished the transferring of a number of its specialty departments from Adrian, Mich., to Monessen, Pa., where it operates an open-hearth steel plant and rod, wire, wire nail and fencing departments.

At the annual meeting of the William Tod Company, Youngstown, Ohio, March 12, directors were elected as

follows: David Tod, John Stambaugh, H. H. Stambaugh, A. H. Helander, L. A. Woodard. The officers of the company were re-elected as follows: David Tod, president; L. A. Woodard, vice-president and general manager; A. H. Helander, second vice-president; H. J. Stambaugh, secretary and treasurer.

This week the offices of Alex. Laughlin & Co., engineers and contractors, remove from the Lewis Building to the Diamond National Bank Building, Pittsburgh.

A meeting of the American Institute of Electrical Engineers will be held in Pittsburgh on Friday and Saturday, April 18 and 19, under the auspices of the new committee which has just been appointed on the "Use of Electricity in Mines" of which George R. Wood, consulting engineer of the Berwind-White Coal Company, is chairman. Owing to the location of the meeting in the heart of the bituminous coal mining district, it is expected that a large number of papers on coal mining will be presented.

The Standard Steel Car Company has purchased for its plant at Butler, Pa., a 20-ton electric crane from the Brown Hoisting Machinery Company, Cleveland, Ohio.

The Pedrick Tool & Machine Company is the name under which A. D., H. A. and D. W. Pedrick, who have withdrawn from the firm of H. B. Underwood & Co., will conduct a business of their own at 3640 North Lawrence street, Philadelphia, Pa. The line of portable tools which the Pedricks originated and have been making since the time of the Pedrick & Ayer Company down to the present will be manufactured and considerably improved, as the factory will be especially devoted to building tools and not to a general jobbing trade. The portable tools which will be built comprise machines that have been well known for years, as follows: Cylinder boring bars, cylinder and dome facers, crankpin turning machines, driving box planer tool, pipe benders, milling machine, radius planing attachment and valve seat rotary planers.

The Standard Steel Company, Bedford, Ohio, which erected a plant for the manufacture of steel sheets, has applied to the courts for the appointment of a receiver or special trustee to wind up its affairs for the benefit of stockholders and creditors. The company has an authorized capital stock of \$100,000, of which \$85,700 is outstanding. The petition recites that the company acquired land, built a plant and acquired machinery, but lack of capital and unforeseen difficulties prevent the carrying on of business. C. R. Williams, W. W. Mills, W. A. Green, W. W. Sproul, Edwin Davis and Roland W. White are the directors.

James M. Motley, dealer in equipment and material for railroads, mines and plantations, removed March 1 from 71 Broadway to larger offices at 71 Beaver street (16 and 18 Exchange place), New York. The export department of the following will be under his direct management at the new address: Weir Frog Company, Cincinnati, Ohio; Youngstown Car & Mfg. Company, Youngstown, Ohio; Southern Car Company, High Point, N. C.; Glover Machine Works, Marietta, Ga.; Garfield Fire Clay Company, Robinson, Pa.

The Morrison Machinery & Supply Company, Richmond, Va., is in the market for a 150-hp. horizontal tubular boiler, 125 lb. steam working pressure; also wants prices on good second-hand wrought-iron pipe of all sizes, and price on a 2 to 3-ton electric hoist with hook for attaching to traveling crane, second-hand preferred.

The Sprecher Mfg. Company, manufacturer of hardware and supplies for farmers, builders and contractors, Ephrata, Pa., advises the trade that on March 24 its business will be turned over to the Ephrata Foundry & Machine Works, J. G. Leber proprietor.

The Warren City Tank & Boiler Company, Warren, Ohio, has a large force of men busily engaged in erecting its new temporary plant and expects to resume operations March 20, running night and day.

## Questions on Scientific Management

A Chicago Conference at Which the Taylor System Is Opposed and Defended

The fifth conference of the Western Economic Society held March 14 and 15 at the Hotel Sherman, Chicago, with "Scientific Management" as the subject, developed a number of interesting discussions. There were five sessions. At the first, having as its topic "A General View of the Taylor System," the papers included one on "Systematized and Scientific Management" by H. P. Kendall, manager of the Plimpton Press, and one on "Time Study and Task Setting" by Sanford E. Thompson, on which the discussion was opened by Joseph C. Regan, Yale & Towne Mfg. Company. At the second session, which dealt with "Some Consequences of Scientific Management," the addresses were by Fred. M. Feiker, C. B. Thompson, Hollis Godfrey and Carl G. Barth. Mr. Barth spoke on "The Standardization of Processes." The subject of the third session was "Scientific Management and Labor," and that of the fourth session "Applications of Scientific Management." The fifth session was devoted to a summary and questionnaire.

Both of the scope of the programme and the open character of the meetings gave opportunity for the presentation of objections to scientific management, and a large part of the interest developed centered about the address of John P. Frey, editor of the International Molders' Journal, and about the list of questions considered at the last session, these being framed very largely to bring out the opposition viewpoint.

### Questions on the Taylor System

In the absence of Frederick W. Taylor on account of illness Messrs. Gilbreth, Barth and Cooke made reply to the following questions, which in general represented the various points at issue in the conference:

1. Has there anywhere been presented a summary of the all-round results actually accomplished in any company under scientific management?
2. Since writing the book called "Shop Management," have you not changed your views regarding several important points discussed by you in this book?
3. The following sentence has been largely quoted in newspapers and by labor leaders from your book "Shop Management," as expressing the views of those interested in scientific management: "All employees should bear in mind that each shop exists first, last, and all the time for the purpose of paying dividends to its owners." Does this quotation represent your present views?
4. Does not scientific management contemplate the substitution of cheap men for high-class mechanics?
5. If there is room for all kinds of men under scientific management, what do you mean by saying that the task should be made so severe that only "first-class" men can accomplish it?
6. The statement has been made many times in the press and is almost universally made by labor leaders, "that scientific management is merely a scheme for 'speeding up' workmen and getting them to do twice as much work as they formerly did for the same old wages."
7. What provision, if any, has been made for people who are thrown out of work under scientific management? You say that the laborers in the yard of the Bethlehem Steel Company were reduced from between 400 and 600 to about 140. What became of those who were thrown out of work?
8. Does scientific management contemplate shorter hours for workmen?
9. Will you state your views as to labor unions in their relation to scientific management? Is there any reason why there should not be collective bargaining under scientific management?
10. From your talks with workmen, what do you conclude is their chief objection to the introduction of scientific management?
11. What are the objections of labor leaders to scientific management?
12. The statement has been made that it is an indignity to ask an American workman to submit to time-study with a stop-watch, and that this study is annoying to the workman and tends to make him nervous and undermine his health. Is this true?
13. If the output of workmen under scientific management is increased 260 to 300 per cent., are not the workmen entitled to more than 33 to 100 per cent. increase in wages?
14. What was the outcome of the hearings before the Congressional committee to investigate the Taylor system of management?
15. What has been the final outcome of the introduction of scientific management into the Watertown Arsenal?
16. Will the scheme of profit sharing advocated by Mr. Perkins render all of the complications incident to scientific management unnecessary?

### Questions Answered

Broadly, the replies were to the effect that there has been no change in Mr. Taylor's views regarding shop management since the publication of his book by that name. For obvious reasons, it was also stated, there can have been no change in the general proposition that a shop exists first, last and all the time for the purpose of paying dividends to its owners. Scientific management does not contemplate the substitution of cheap men for high-class mechanics except as that results from a natural distribu-

tion of men to the task they are best able to perform. The scientific management regime is not so much an administration for the speeding up of men as it is for the purpose of eliminating lost motion and concentrating attention upon effective effort. The important point was brought out that if the sum total of all work to be done is constant, the opposition to scientific management predicated upon that theory is undoubtedly consistent in maintaining that scientific management is depriving the less efficient man of work for the benefit of the more efficient. On the contrary, if that assumption is as ridiculous as reason and experience show it to be, then scientific management simply operates towards the recruiting of skilled labor from the ranks of the unskilled, and never in the history of the world has there been a greater demand for skilled labor than at present.

Regarding the proportion of the profits arising out of scientific management to be considered as labor's share, a percentage now generally assumed from 33 to 100 per cent. where the output is increased from 200 to 300 per cent., it was stated on behalf of Mr. Taylor that in that division of the profits where a certain portion was necessary to pay for the installation of scientific management and another portion became the owner's share, the balance belonging to the workmen, as shown by Mr. Taylor's observations covering several years, varied from 35 to 65 per cent., but that the future might bring about a considerably different distribution of these profits.

As indicated by the statements made in behalf of labor, its objection to scientific management is based upon the fact that it tends to promote only an additional return to the shop owner and uses labor only as an instrument to that end, without adequate reward and without consideration of the humane aspects and that scientific management also operates against collective bargaining by the working man.

The offices of the Western Economic Society, where the papers read at last week's meeting may be obtained, are at Fifty-eighth street and Ellis avenue, Chicago.

### Sloss-Sheffield Annual Report

The Sloss-Sheffield Steel & Iron Company's report for the year ended November 30, 1912, shows the income account to compare as follows with that for the previous year:

	1912	1911
*Profit on pig iron.....	\$453,961	\$284,350
Profit on coal.....	74,756	79,469
Profit on coke.....	108,506	122,151
Ore sales.....	1,854	5,046
Rent, royalties, etc.....	217,776	226,816
Interest, dividends, etc.....	14,475	13,685
Total income.....	\$871,328	\$733,509
Taxes and licenses.....	64,117	68,249
General expenses.....	27,408	30,648
Interest.....	236,548	229,964
Surplus.....	\$553,255	\$404,649
Preferred dividends.....	469,000	469,000
Surplus.....	\$84,255	\$186,351
Previous surplus.....	3,042,693	3,107,044
Total surplus.....	\$3,126,948	\$3,042,693

\*After charge for depreciation on coal and iron ore of 25c. per ton on iron for extraordinary repairs and renewals, and 35c. per ton profit on coke manufactured.

†Deficit.

The gross sales and earnings in 1912 amounted to \$5,299,719, against \$4,521,360 in 1911. Depreciation charged off in 1912 was \$114,409, against \$117,110 in 1911. The working capital at the end of the year was \$1,408,949, against \$1,520,937.

**Milwaukee Foundry Conditions.**—At a meeting of the Milwaukee Metal Trades and Foundry Association, March 14, at which Theodore O. Vilter presided, reports were made as to trade conditions, showing that Milwaukee shops have considerable work ahead, with prospects of a continuance of the present rate of demand. The foundries represented at the meeting have had an ample supply of labor through the winter, though as spring comes on outside work will compete for men. As a means of providing sufficient labor under all conditions to operate their shops full, the local foundrymen are planning to take on more apprentices. In a number of cases Milwaukee machine shops are operating night turns.



## Metal Trades Annual Meetings

### Chicago Branch Indorses Continuation Schools

A discussion of the plans for vocational schools in Illinois, for which provision is to be made in a bill to be introduced in the Illinois State Legislature, was presented by Edwin G. Cooley, formerly superintendent of schools of Chicago, before the Chicago Branch of the National Metal Trades Association, at its fifteenth annual dinner and meeting at the Mid-day Club, Chicago, March 13. Mr. Cooley recently returned from abroad, where he made a study of the German system of continuation schools. The particular purpose of this type of school as distinguished from the manual training work of our present school system is to provide for the youth of 14 to 18 years, who for various reasons has abandoned cultural education, a practical instruction in the particular trade to which the boy or girl aspires. The plan provides for a board of five whose only connection with the present school boards will be the ex-officio membership of the superintendent of schools, the other members being two employers and two skilled employees.

The Chicago Branch, after due consideration, officially indorses this bill. It does not compel communities to establish any of the vocational schools described in the bill, but they are permitted to organize them after a referendum. Where they are organized, State aid is given to the amount of one-half of the running expenses of the school, the local community providing buildings and initial equipment. Attendance for 240 hours in each year is compulsory on youth of both sexes between 14 and 18 years, who are employed or are not pupils in other schools. Provision is made for vocational evening schools for pupils over 18, attendance being voluntary; also for part time schools, the pupils of which will spend alternate weeks in shop, factory, store or office and at the schools where instruction will be given to supplement and render effective the work of the pupils in their respective employments.

A report of the progress of the co-operative course for shop apprentices started some five years ago and conducted at the Lewis Institute was made by C. E. Hoyt. Action was taken looking toward a more active support of this course of instruction. In other reports presented attention was especially called to the lack of English-speaking skilled labor, to the growing necessity for training apprentices, to the rapid approach of the time when the question of an eight-hour working day will have to be met, and to the increasingly obvious fact that commercial supremacy is based upon our products representing an increasing proportion of skilled labor and a decreasing proportion of natural resources. The officers, including N. W. Dingwall, president; W. L. Kroeschell, vice-president; O. A. Olson, treasurer, and Paul Blatchford, secretary, were re-elected.

### Springfield Branch

At the annual meeting of the Springfield Branch, National Metal Trades Association, Springfield, Mass., the following officers were elected: President, Francis F. Squire, president and secretary Page-Storms Drop Forge Company, Chicopee, Mass.; vice-president, C. P. Fay, vice-president J. Stevens Arms & Tool Company, Chicopee Falls, Mass. Executive committee, F. C. Breakspear, A. G. Spalding & Bros. Mfg. Company, Chicopee, Mass.; Albert E. Smith, Knox Automobile Company, Springfield, Mass.; R. D. Reed, H. B. Smith Company, Westfield, Mass.; F. C. Feiker, Northampton Cutlery Company, Northampton, Mass.; A. J. Tucker, Cheney Bigelow Wire Works, Springfield, Mass.; G. A. Ludington, Fisk Rubber Company, Chicopee Falls, Mass.; C. W. Richards, Stevens-Duryea Company, Chicopee Falls, Mass.

### Boston Branch

The Boston Branch, National Metal Trades Association, at its annual meeting held at Young's Hotel, Boston, Mass., elected the following officers: President, Martin B. McLauthlin, George T. McLauthlin Company, Boston; vice-president, George F. Lawley, George Lawley & Son Corporation, Neponset, Mass.; treasurer, Duncan D. Russell, James Russell Boiler Works, South Boston. Executive committee, to serve until 1914, holding over, Winslow Blanchard, Blanchard Machine Company, Cambridgeport; G. A. Webster, Star Brass Mfg. Company, Boston; to

serve until 1915, Herbert W. Woodworth, American Tool & Machine Company, Boston; E. I. Blount, J. G. Blount Company, Everett. Honorary member, Fred F. Stockwell, Barbour-Stockwell Company, Cambridge.

## To Handle the Tariff in the Senate

The United States Senate has reorganized its committees, the Democrats now having control. The Finance Committee, which has charge of the tariff revision measures that will be passed by the House in the extra session called by President Wilson to convene April 7, is now made up as follows:

Democrats.	Republicans.
Furnifold McL. Simmons, of North Carolina, chairman.	Boies Penrose, of Pennsylvania.
William J. Stone, of Missouri.	Henry Cabot Lodge, of Massachusetts.
John Sharp Williams, of Mississippi.	Porter J. McCumber, of North Dakota.
Charles F. Johnson, of Maine.	Reed Smoot, of Utah.
Benjamin F. Shively, of Indiana.	Jacob H. Gallinger, of New Hampshire.
Hoke Smith, of Georgia.	Clarence D. Clark, of Wyoming.
Charles S. Thomas, of Colorado.	Robert M. La Follette, of Wisconsin.
Ollie M. James, of Kentucky.	
William Hughes, of New Jersey.	
Thomas F. Gore, of Oklahoma.	

This committee, so far as its Democratic or majority members is concerned, is considered as "progressive" and likely to approve the measures that will be reported by the Ways and Means Committee and passed by the House. The names of the Democratic members of the Ways and Means Committee were published in *The Iron Age* last week.

Previously, the Finance Committee, in addition to having charge of the tariff matters, also had charge of banking and currency legislation. In the reorganization of the Senate this has been changed, and a new committee, on Banking and Currency, has been created, which is made up as follows:

Democrats.	Republicans.
Robert L. Owen, of Oklahoma, chairman.	Knut Nelson, of Minnesota.
Gilbert M. Hitchcock, of Nebraska.	Joseph L. Bristow, of Kansas.
James A. O'Gorman, of New York.	Theodore E. Burton, of Ohio.
James A. Reed, of Missouri.	Coe I. Crawford, of South Dakota.
Atlee Pomerene, of Ohio.	John W. Weeks, of Massachusetts.
John F. Shafroth, of Colorado.	
Henry F. Hollis, of New Hampshire.	

The Committee on Interstate Commerce, having charge of legislation affecting corporations, etc., is as follows:

Democrats.	Republicans.
Francis G. Newlands, of Nevada, chairman.	Moses E. Clapp, of Minnesota.
Atlee Pomerene, of Ohio.	Albert B. Cummins, of Iowa.
John W. Kern, of Indiana.	Frank B. Brandegee, of Connecticut.
Charles S. Thomas, of Colorado.	George T. Oliver, of Pennsylvania.
Henry L. Myers, of Montana.	Henry F. Lippitt, of Rhode Island.
Ellison D. Smith, of South Carolina.	Charles E. Townsend, of Michigan.
Joseph T. Robinson, of Arkansas.	Robert M. La Follette, of Wisconsin.
Willard Saulsbury, of Delaware.	
William H. Thompson, of Kansas.	

## Labor Notes

The action taken by the Iron Molders' Union locals 84 and 436 of Buffalo in calling off the strike in that city, which had been on for seven months, was due to the fact, as stated by an officer of the union, that as it is carrying on a large number of strikes in other localities, with the probability that a large number of molders will be called on strike in the near future, the reserve fund was being taxed to a serious extent. The union has not asked any of the shops involved in the Buffalo strike to run as strictly union shops. The strikers received \$7 a week in benefits from the union, but lost an average of \$14 a week, as their wages are about \$21 a week.

Vice-president Hannan of the machinists' union, the International Association of Machinists, writing in the Machinists' Journal of a visit he made to Cleveland, Ohio, says: "I understand that there are 30,000 machinists working around Cleveland and we have less than 1000 members there. The placing of one organizer there will never organize the city of Cleveland, not in a thousand years."

The Central Radiator Company, Lansdale, Pa., has advanced its molders' wages to per cent. The company has completed the enlargement of its shops and is engaging additional help.

## United States Steel Corporation's 1912 Report

(Continued from page 721)

## Maintenance, Renewals and Extraordinary Replacements

The expenditures made by all companies in 1912 for maintenance and renewals, including the relining of blast furnaces, and for extraordinary replacements, in comparison with expenditures for the same purposes in the preceding year, were as follows:

	1912.	1911.
Ordinary maintenance and repairs..	\$43,853,137.13	\$37,882,850.77
Extraordinary replacements .....	4,895,299.83	7,077,414.37
Total .....	\$48,748,436.96	\$44,960,265.14

The entire amount of the foregoing expenditures was charged to current operating expenses and to depreciation and replacement funds reserved from earnings.

## Employees and Pay Rolls

The average number of employees in the service of all companies in the fiscal year of 1912, in comparison with the fiscal year of 1911, was as follows:

	1912.	1911.
Manufacturing properties .....	161,774	140,118
Coal and coke properties .....	24,394	21,723
Iron ore properties .....	12,597*	14,445
Transportation properties .....	19,438	17,963
Miscellaneous properties .....	2,822	2,639
Total .....	221,025	196,888
Total annual salaries and wages....	\$189,351,602	\$161,419,031

\*Decrease in number of employees of ore properties is due principally to lesser stripping and development operations conducted in 1912.

## Employees' Stock Subscriptions

In January, 1913, there was again offered to the employees of the United States Steel Corporation and of the subsidiary companies the privilege of subscribing for preferred or common stock. The subscription price was fixed at \$109 per share for the preferred and \$66 per share for the common stock. The allowances for special compensation or bonus to be paid subscribers who retain their stock were fixed at \$5 per share per year for the preferred and \$3.50 per share annually for the common stock. The conditions attached to the offer and subscription, aside from the features of subscription price and the amount of special compensation or bonus to be paid, were substantially the same as those under which stock has been offered to employees in each of the previous ten years. Subscriptions were received from 36,119 employees for an aggregate of 34,551 shares of preferred and 25,793 shares of common stock.

## Shipments Domestic and Export

The shipments of all classes of products to customers outside of the organization in 1912, in comparison with shipments in 1911, were as follows:

	1912.	1911.
<b>Domestic.</b>		
Rolled steel and other finished products...	10,299,890	7,740,897
Pig iron, spiegel, ferro and scrap.....	501,327	399,935
Iron ore, coal and coke.....	1,825,265	1,587,322
Sundry materials and by-products.....	70,453	63,206
Total tons all kinds of materials, except cement .....	12,696,935	9,791,360
Cement (bbl.) .....	10,047,573	7,580,758
<b>Export.</b>		
Rolled steel and other finished products..	2,233,570	1,719,272
Pig iron and scrap .....	46,503	26,728
Sundry materials and by-products.....	723	492
Total tons all kinds of materials, except cement .....	2,280,796	1,746,492
Cement (bbl.) .....		110,364
Aggregate rolled steel and other finished products, domestic and export trade .....	12,533,460	9,460,169

While the increase in the amount of business done in 1912 compared with 1911, as represented by tonnage of shipments of rolled steel and other finished products, equaled 32.5 per cent., the increase in the gross selling value f. o. b. mills of the entire tonnage shipped, including cement, was but 23.7 per cent.; and the increase in total earnings (before deducting charge for interest on outstanding capital obligations of the subsidiary companies) was only 5 per cent. These differences are due principally to decreased prices received for products. The average price received for the entire tonnage shipped in 1912 was, on domestic business, about \$3.30 per ton less than the similar average received in 1911; and on the export business, about \$1.10 per ton less.

## Maintenance and Replacements

The expenditures made in the year for repairs, maintenance and general upkeep of the properties, in comparison with similar outlays in 1911, were as follows:

	1912.	1911.
Ordinary repairs and maintenance.....	\$43,853,137	\$37,882,851
Extraordinary replacements and general rehabilitation .....	4,895,300	7,077,414
Total .....	\$48,748,437	\$44,960,265

The aggregate amount of charges to and allowances from gross earnings for the year to cover deterioration arising from wear and tear of improvements, exhaustion of minerals and obsolescence, equaled the sum of \$76,193,559, as compared with \$64,134,706 during the preceding year. Included in these respective totals are the above expenditures for ordinary repairs and maintenance. In the year a total of \$10,022,865.47 of bonds, mortgages and purchase money obligations of the corporation and the subsidiary companies was paid off. Of this total \$8,352,500 represents bonds redeemed through the sinking funds of the mortgages securing them.

Bonds of subsidiary companies to the amount of \$32,275,000 were issued and sold in the year for outlays made and to be made for additions and betterments. There were also assumed in connection with the acquirement of sundry tracts of coal and limestone property, \$10,246.50 of real estate mortgages and a \$10,000 purchase money obligation.

## Capital Expenditures

The expenditures made by the corporation and the subsidiary companies in the year for additional property, extensions and new construction, less credits for property sold and for stripping and development work at mines, aggregated \$13,780,361.56, viz.:

For the Gary, Ind., extensions.....	\$1,725,052.00
For Minnesota steel plant at Duluth, Minn., and terminal railroad connecting same with trunk lines.....	2,676,066.48
For Tennessee Coal, Iron & Railroad Company extensions .....	1,833,094.21
For all other properties and extensions, including net credit account iron mine stripping and development operations .....	7,546,148.87
	\$13,780,361.56

These expenditures on capital account during 1912, aside from the construction of the Duluth, Minn., plant, covered very largely work in completing various additions and extensions commenced in earlier years. Work on the construction of the Duluth plant progressed actively, additional expenditures having been made of \$2,676,066 on both the steel plant and the terminal railroad. It is hoped this plant will be ready for operation in the spring of 1914.

The several subsidiary railroad companies acquired in the year additional equipment consisting of 2 locomotives and 2,278 freight cars of various kinds, all charged to capital account. There were also acquired on replacement account, 1 locomotive, 8 passenger, 47 freight cars and 1 road car. For service on the Great Lakes there were purchased 3 new 12,000-ton ore carrying steamships, which will go into commission with the opening of navigation in 1913. The cost of the vessels has been charged to replacement account, in lieu of the value of one vessel lost and of old steamers sold on account of their becoming more or less obsolete. There was also purchased for service in the export trade an additional freight steamer. The vessels on the Great Lakes now consist of 78 steamers, 21 steel barges, 2 tug boats and 1 scow. On the Ohio River are 2 steamers, 39 steel barges and 65 wood barges. On the ocean 3 steamers are owned.

## Appropriations for New Construction

In the latter part of the year substantial appropriations were made for extensions and additions to the various plants and properties. No considerable amount of expenditures was, however, made on these authorizations during 1912. At the close of the year the amount unexpended on appropriations for construction and extraordinary replacements, including iron ore mine stripping operations for 1913, equaled approximately \$40,000,000. It is estimated that only about \$30,000,000 of this will be expended during 1913. These authorizations cover a wide range of sundry additions and improvements, the more important items of new work included, aside from the requirements for the new plant at Duluth, being the following:

At Edgar Thomson works of Carnegie Steel Company the construction of a new 14-furnace open-hearth steel plant; also the relocation and rearrangement of the blooming mill and No. 2 rail mill in order to produce a greater diversity of product. At Duquesne works is being installed an additional 10-in. bar mill, and 14 open-hearth furnaces are being reconstructed in order to use producer gas.

At South works of Illinois Steel Company, two new open-hearth furnaces are being installed and the rail mill is being remodeled.

At Gary works of Indiana Steel Company a new reversing slabbing mill is in course of construction and 28 additional boilers are being installed for utilization of waste heat at open-hearth furnace plant.

At Duluth, the Duluth, Missabe & Northern Railway Company has commenced the construction of a new steel ore dock of 384 pockets. For use by this railroad and the Duluth & Iron Range Railroad Company, there have been ordered for 1913 delivery, 13 locomotives and 2,000 steel ore cars. There have also been purchased for 1913 delivery 25 locomotives and 750 steel cars for the subsidiary railroads in the Pittsburgh, Cleveland and Chicago districts.

In order to meet in a more satisfactory manner the growing demands of the Canadian trade for the products of the subsidiary companies, it has been decided to establish a manufacturing plant in Canada at the site which the corporation secured some years ago at Ojibway, Ontario, opposite the city of Detroit. The site consists of about 1500 acres with a frontage of about a mile and a half on the Detroit River. The plans for and the scope of the construction of the plant have not yet been fully developed, but will probably include blast furnaces, open-hearth steel works, rail mill, wire mill, structural and bar mills; and perhaps some other mills. It is expected the cost of the plant will in part be financed by an issue of bonds.

The tonnage output of the manufacturing plants of the subsidiary companies located at Gary, Indiana, during 1912 was the largest of any year since their construction, being as follows: Gary steel plant of Indiana Steel Company: 1,093,578 tons of pig-iron, 1,669,389 tons of open-hearth steel ingots 468,801 tons of open-hearth steel rails and 717,702 tons of various other rolled steel products. The by-product coke plant produced 2,490,854 tons of coke. The production of the sheet plant was 139,520 tons of black and galvanized sheets, and the bridge plant produced 83,018 tons of fabricated steel work.

#### Wage Increases

On February 1, 1913, a general increase was made in the wages and salaries of a large proportion of the employees of the subsidiary companies. These advances extended to about 75 per cent. of the total number of all employees, including substantially all of the wage earners theretofore receiving less than \$2 per day. The 25 per cent. of employees not affected comprised very largely the higher paid wage earners and salaried employees. The increases were relatively higher in the case of the lower paid employees, averaging in the case of employees receiving less than \$2 per day about 12½ per cent. This advance in wage and salary rates calls for an increase of approximately \$12,000,000 in the annual pay roll, on the basis of the number of employees in service during 1912. The rates of wages now paid by the corporation to ordinary labor and to skilled workmen generally, are the highest in the history of the industry.

#### Changes in Hours of Labor

In the concluding portion of his report, Chairman Gary says:

"On May 28, 1912, there was sent to stockholders a copy of the report of the committee of stockholders appointed at the annual meeting held on April 17, 1911, to investigate conditions of labor in the mills. In the circular of the chairman, accompanying the same, stockholders were advised that in response to the recommendation of the committee mentioned, the Finance Committee of the corporation had appointed a committee consisting of the chairman, Mr. Roberts and the president of the corporation 'to consider what, if any, arrangement with a view to reducing the 12-hour day, in so far as it now exists among the employees of the subsidiary companies, is reasonable, just and practicable.' This committee has given careful study to the problem in question, but has as yet been unable to formu-

late any feasible plan for eliminating entirely the 12-hour day in those departments where operations are largely continuous, which would be practicable as well as acceptable to the employees. So far, however, as it has been possible to reduce the so-called 12-hour turn, it has been done, although no considerable reduction has been made in the number of employees (which the stockholders' committee found constituted only about 25 per cent. of the total number of employees) working a 12-hour day.

"Owing to the great demand for labor during the major part of the past year it would have been impossible to fully operate the mills in case the working hours per day had been generally reduced. It is believed that unless competing iron and steel manufacturers will also enforce a less than 12-hour day the effort to reduce the working hours per day at all our works will result in losing large numbers of our employees, many of them preferring to take positions requiring more hours of work per day. This feature has been noticeable during the past year at a number of the plants where workmen have left our employ to enter the employ of other manufacturers where opportunity was given to work seven days per week. The six-day week has been and is being rigidly observed in all of our plants and departments. The committee is continuing its investigation and study of the problem and is hopeful that a satisfactory solution may ultimately be found, but the issue involved is very large and important and presents many difficulties which at the moment seem almost impossible to overcome. As the stockholders' committee pointed out, 'the 12-hour day has, by its general acceptance and practice over a considerable period of years, become firmly intrenched, and any sudden or arbitrary change would involve a revolution in mill operations. Nor are we sure that it would be possible for any one employer, or any number of employers, to inaugurate a shorter hour system, unless a similar policy should be adopted by all employers engaged in the same industry.'"

#### Pension Fund Expenditures

There was set aside from the accumulated undivided surplus an additional \$500,000 for permanent pension fund reserve. During the year the corporation paid over to the trustees of the United States Steel and Carnegie Pension Fund, the sum of \$207,479.37 for current disbursements. The total income of the trustees of the fund for 1912 was as follows:

From U. S. Steel Corporation	
Interest at 5 per cent. on the \$1,500,000 of Pension Fund reserved at close of 1911.....	\$75,000.00
Balance contributed to make up the full amount required by the trustees for 1912 disbursements....	132,479.37
	\$207,479.37
From Carnegie Relief Fund	
Income on the \$4,000,000 fund created by Mr. Carnegie .....	\$200,000.00
From interest on bank balances.....	7,290.31
Total income of the trustees.....	\$414,769.68
Disbursements:	
For pensions and relief.....	\$402,162.62
For management expenses .....	12,607.06
	414,769.68

At the close of the year there were 1843 ex-employees on the pension rolls.

#### Ore-Carrying Vessels for the Bethlehem Company

The inquiry of the Bethlehem Steel Company for boats to carry ore from its Chilean iron mines, to which reference is again made in the press, was sent out early in February. Shipbuilders both in this country and in most of the foreign shipbuilding countries were asked to submit bids on 10 ore vessels of 15,000-tons carrying capacity each. The specifications were quite general, the capacity and kind of service being indicated, while the builders were asked to suggest the particular type and equipment of vessels.

**The Steel Corporation's Canadian City.**—The name of the city where the new Canadian steel plant of the United States Steel Corporation will be built will be Ojibway. A movement was started some weeks ago to call the new town Pontiac, but owing to the fact that it was likely to be confused with Pontiac in Michigan and that a post office called Ojibway was already established on the site, it was decided to retain the local name.



# The Machinery Markets

Reports for the week from the majority of machinery distributing centers are of a pleasing character, although a little quieter tendency in buying is observed in some cities. As a rule factories continue busy on orders booked in the last few months and are far from feeling any falling off in business. More deliberation on the part of buyers in placing orders has been felt by New York salesmen, although there still continues a fair run of business with some of the dealers. Buying is somewhat less active in Philadelphia and the inquiries continue to be for one or two tools only. In New England orders are being received in satisfactory volume and it is noted that alternations of activity and dullness in the matter of orders are marked in that territory. In Cleveland there is good inquiry for single tools with prospect of even better miscellaneous demand, while the Lake Shore Railroad is expected to be in the market for equipment soon. Conditions in Cincinnati are unchanged except that the export trade is slightly improved. In Detroit makers of automobile accessories are a principal factor in the demand for machinery, but sales have fallen off as compared with those of the previous week. Conditions are without special feature in Milwaukee, but the situation is considered satisfactory. There are no large lists before the St. Louis trade, but the total of sales is considered good. In the Central South conditions are favorable to trade and the demand for power elevators and conveying machinery is especially notable. A satisfactory volume of business is reported from Birmingham where a great deal of building is projected. The demand for machinery is satisfactory in Texas, and the prospects are especially good for equipment used in cotton seed mills. On the Pacific coast equipment for lumbering has the promise of unusually heavy demand, while machinery for the Alaskan mines and salmon fisheries is moving briskly.

## New York

NEW YORK, March 19, 1913.

In the local machinery market there has been little change in the last week, except a slightly increased degree of hesitancy in placing orders. The inquiries received by machine tool dealers continue fair in number, but all of them specify only one or two machines and action on them is slower than it was a few weeks ago. Some of the dealers whose line is varied report as they did last week, but their sales are good in the aggregate. With manufacturers' salesmen activity has declined, but in practically every case the factories which they represent are busy and with some types of machine tools deliveries cannot be made for some months to come. This is true, especially of special tools, which reduce the cost of production toward which there has been a steadily growing trend. The sale of the entire plant of the E. R. Thomas Motor Car Company, Buffalo, N. Y., from March 17 to 22, is regarded as a quieting influence on the market, as it means the absorption of 5483 lots of machine tools, machinery and equipment, most of which probably will be taken by dealers in second-hand machinery. The Canadian Pacific Railway has issued from Montreal a miscellaneous list of about 100 items of railroad stock equipment to be delivered to various of its shops along its line as far west as Vancouver, B. C.

The General Vehicle Company is expected to close this week on a few tools for its plant in Long Island City. This company which, as previously noted, is building an addition to its factory, will issue a large list some time in June, it is understood, on which deliveries will be made in January, 1914.

The West Side Foundry Company, Troy, N. Y., has completed the erection of an addition to its foundry and has leased property of five acres nearby which will greatly increase its capacity. The company has installed a 72-in. Byram cupola with a Root blower and a 5-ton crane.

The Morse Chain Company, Ithaca, N. Y., is planning the erection of an addition 70 x 100 ft. to its steel mill. Improvements will be made to its equipment which will include the addition of 500 to 700 hp. to its boiler capacity and two 300-kw. direct-connected units to its power plant. The company has just completed the erection of a main building 64 x 254 ft., four stories.

The Waterloo Water Company, Waterloo, N. Y., C. H. Ross, superintendent, will erect a 150,000-gal. water tower and will purchase and install a 2,000,000-gal. direct-connected steam pump, a 500,000-gal. power pump, 1,000,000-gal. pressure filters and 50  $\frac{3}{4}$ -in. meters.

Plans are being prepared for an addition to the plant of the Imperial Pneumatic Tool Company, Waverly, N. Y., an auxiliary of the Ingersoll-Rand Company.

The Eastern Power Company of New York, Port Jervis, N. Y., has been incorporated with \$100,000 capital stock to develop and supply electric power. The directors are W. P. Gregg, D. R. Thomas, Port Jervis, and C. P. Wright, Susquehanna, Pa.

Robert Ablett & Co., Inc., Whitesboro, N. Y., have filed incorporation papers with an authorized capital stock of \$300,000 to manufacture knit goods, etc. Robert Ablett, O. Ostrander and H. W. Dunn, Whitesboro, are the directors.

It is stated that about \$100,000 will be expended on improvements to the plant of the Hornell Electric Company, Hornell, N. Y., by the new owners, a syndicate of Philadelphia capitalists who recently purchased the business and plant of the company. H. A. Mason, Hornell, is a director.

The Riverhead Agricultural Works, Riverhead, N. Y., has been incorporated with a capital stock of \$20,000 to manufacture and repair agricultural implements. The incorporators are Dwight T. Cowin, Adam Hill, Jr., and George L. Young.

The Pitzele Stove Company, Corning, N. Y., has been incorporated with a capital stock of \$15,000 to manufacture and deal in stoves, etc., by M. A. and H. A. Isaacs and S. E. Spikes and S. Reigler.

The Atlas Die Casting Company, Syracuse, N. Y., has been incorporated with a capital stock of \$10,000 to manufacture castings of bronze, aluminum, iron, steel, etc. Frank R. Holmes, Morey S. Smith, S. G. Schlachter, Syracuse, are the incorporators.

The Union Sanitary Mfg. Company, Syracuse, N. Y., has been incorporated with a capital stock of \$50,000 to manufacture and deal in plumbers' supplies, etc. L. Unkless and J. R. and W. A. Buecheler are the incorporators.

The Hotchkiss Metal Form Company, formerly of Carbondale, Pa., manufacturer of metal forms for cement sidewalks, posts, poles, concrete walls, etc., will occupy after April 1 its new factory building now being erected by the Cement Products Company on Jarvis street, Binghamton, N. Y. The company recently increased its capital stock from \$15,000 to \$36,000 to provide for new plant and equipment.

Preliminary plans are in progress for a municipal electric light plant at Binghamton, N. Y. J. A. Giles is city engineer and Douglas Sprague, 39-41 Cortland street, New York City, consulting engineer.

The Coons-Mabbett Mfg. Company, Rochester, has been incorporated with a capital stock of \$20,000 to manufacture evaporating machinery. Burton C. Coons and L. G. Mabbett, 60 Reynolds Arcade, and John A. Taylor are the incorporators.

The Rochester Railway & Light Company, Rochester, N. Y., will build a plant for the manufacture of concrete poles, posts, manhole forms, etc. The plant will be equipped with electric hoists and conveyors. The principal building will be 40 x 80 ft.

Bonds to the amount of \$150,000 have been issued by the village of Albion, N. Y., for the construction of a sewage disposal plant and sewer system from plans prepared by Charles A. Ingersoll, Buffalo, N. Y.

The Sanitary Dairy Machine Company, Buffalo, N. Y., has been incorporated with a capital stock of \$100,000 by F. C. Howard, E. M. Brossman and C. T. Anderson to manufacture patented dairy machinery. A plant is being arranged for.

The Victoria Metal Company, Erie, Pa., is making extensions to its plant in the form of a new brass foundry, together with a department for die casting.

## New England

BOSTON, MASS., March 18, 1913.

Every indication points to a continuation of good business. Reports from manufacturers in metal lines agree, with few exceptions, that orders are coming in in wholly satisfactory volume. The machine tool builders average to be very active. The volume of sales is not steady; orders come in groups with intervening periods of dullness. But the totals are sufficient to keep the shops running fully up to normal. It has been revealed in the past few weeks that many manufacturers have had a much greater amount of business on their books in the past year than they have avowed. The same fact exists to-day. In inquiring of business houses as to conditions in their trade a tendency to belittle the demand, so far as they individually are affected, is noticed more frequently than would be wished. In almost every instance closer questioning has brought out an expression of confidence and satisfaction with the existing market and few expressions of doubt as to the outlook are heard; the possibilities of tariff revision appear to have been discounted. Even in the textile lines no particular anxiety is manifested.

The Boston dealers report that no lists of any size have been received. The big Boston & Maine list has not been awarded, being still in the hands of the executive officers.

The H. A. Matthews Mfg. Company, Seymour, Conn., manufacturer of stampings of steel, bronze, German silver and other metals, has issued 750 shares of new stock, making its outstanding capital stock \$400,000. The purpose of the increase is to provide for a general enlargement of the business, which is rapidly outgrowing the building erected a year ago.

The Union Foundry Company, Fitchburg, Mass., will build a one-story extension 92 ft. in length.

The French Mfg. Company, Waterbury, Conn., manufacturer of brass tubing, will erect an additional building 40 x 110 ft., one and two stories.

The American Pin Company, Waterville, Conn., will make large additions to its plant, including a factory building 50 x 250 ft., four stories and basement; a boiler house 44 x 100 ft., and a pump house.

The Henry Perkins Company, Bridgewater, Mass., manufacturer of castings, is about to erect an addition to its foundry 25 x 60 ft.

The Noble & Westbrook Mfg. Company, Hartford, Conn., proposes to erect a factory in the spring, in order to secure quarters to take care of an increased volume of product. The company manufactures marking devices of all descriptions, and recently added to its line the Dwight slate marking machine. It also does die cutting and engraving.

The Pequonnock Foundry, Inc., Bridgeport, Conn., manufacturer of grey iron castings, is contemplating adding to its plant in the spring, but no detailed plans have yet been prepared.

The new factory building which will be erected by the Bristol Company, Waterbury, Conn., will be devoted to the wood working and finishing departments. It will be 52 x 160 ft., three stories.

The Saco-Lowell Machine Shops are to add a foundry and cupola building to the plant at Lowell, Mass. The foundry will be 50 x 220 ft. and the cupola building 47 x 73 ft.

The American Tube Works, Boston, Mass., has awarded the contract for an addition to its plant in the neighboring city of Somerville. The structure will be of brick and steel, fireproof construction, 67 x 176 ft., three stories.

The A. H. Wells Company, Waterbury, Conn., manufacturer of brass tubing, will build a one-story addition to its works 26 x 51 ft.

The New York, New Haven & Hartford Railroad proposes to spend \$7,500,000 at New London, Conn., including \$4,000,000 for a bridge across the Thames River, replacing the present structure, and a relocation of the tracks, which will entail a tunnel under the city.

The foundry of the Quigley Furnace & Machine Company, Springfield, Mass., manufacturer of furnaces and coal-burning apparatus, is approaching completion. The foundry is one of the most modern in the country, in fact it is the latest word in a plant for the manufacture of grey iron castings. The company is affiliated with the Baush Machine Tool Company and will do the latter's foundry work. The space now devoted to the Baush foundry will be given over to the erecting department. The demand for the Baush drilling machines has increased to such an extent that additional capacity is imperative and the vacating of the foundry will permit an enlargement of 50 per cent.

Additions to general manufacturing plants in New England include the following: Myers & Gross, Hartford, Conn., addition 36 x 114 ft.; Silverman Bros., Providence, R. I., building for jewelry manufacturing, 60 x 164 ft., three stories; Pratt, Read & Co., Deep River, Conn., factory building 60 x 150 ft., four stories; Aspinook Company, Jewett City, Conn., mill building 50 x 108 ft., three stories; A. E. Hemphill, Holyoke, Mass., mill building 40 x 75 ft., four stories; Dwight Mfg. Company, Holyoke, Mass., additional building 72 x 180 ft., six stories.

## Philadelphia

PHILADELPHIA, PA., March 17, 1913.

Merchants report a slight lull in buying, although manufacturers of machinery and tools continue to receive a fair volume of miscellaneous orders. The week has been bare of large inquiries. Considerable business in various classes of equipment is still under negotiation. While there has been a little inquiry for odd tools from the railroads, expected large lists are still being withheld. Industrial plants continue actively engaged but are light buyers of tools except of a special nature. Locomotive builders continue to book good orders. A large amount of business in power equipment is pending but closes slowly. The demand for second-hand machinery is fair, but considerably below sellers' ideas of a normal market. Very little business is moving in the export trade. Both iron and steel casting plants continue fairly active.

Proposals will be received by the Philadelphia Board of Education, room 392, City Hall, until March 27 for furnishing the Northeast high school one Brown & Sharpe No. 2 (a) universal milling machine, with standard set of tools, and one Brown & Sharpe No. 13 universal grinding machine, including internal and surface grinding attachments, both machines to be delivered and installed; also 435 metal lockers, delivered and installed. Bids will also be received at the same time for 400 metal lockers for the Southern high school, installed and ready for use.

The Pennsylvania Railroad has sent out inquiries for estimates on furnishing a large duplex milling machine.

Magaziner & Potter, architects, have plans in progress for a brick garage and machine shop, 50 x 100 ft., one story, to be erected at 2775 Kensington avenue. Owner's name is withheld at this time.

C. H. Masland & Co., carpet manufacturers, have awarded a contract to William Steele & Sons, architects and engineers, for the erection of a five-story brick warehouse, 65 x 150 ft., at Willard and Amber streets. Steam heat and an electric elevator are to be installed. Architects are prepared to take sub-bids.

Edward M. Bigelow, state highway commissioner, Harrisburg, Pa., will receive proposals until April 2 for the furnishing of machinery, implements and tools for the maintenance of the state highways, in such quantities as may be ordered from time to time in the fiscal year ended May 31, 1914.

It is reported that the American Iron & Steel Mfg. Company, Lebanon, Pa., has decided to erect a large mill for the manufacture of steel for use in its own plant.

The board of directors of the Pennsylvania Railroad has decided upon the electrification of its suburban service on its main line extending from Broad street station to Paoli, Pa., a distance of about 20 miles. The installation of the system will involve an expenditure of about \$4,000,000.

It is stated in the daily prints that the Gibraltar Railway & Equipment Company has leased the Gibraltar rolling mills of the Simon Seyfert estate, at Gibraltar, Pa., for the manufacture of railroad equipment specialties. The plant has been idle for a long time.

The Richmond Radiator Company, New York, has awarded the contract for the building of its new factory, at Wissinoming, in the northeast section of this city, to H. H. Wehmeyer. The main building will be 100 x 355 ft.

The Safety Mfg. Company, Lancaster, Pa., has been incorporated with a capital stock of \$100,000 and has acquired the plant formerly operated by the Independent Foundry Company. A. G. Hostetter is president and John Kaufman is secretary of the company, which will engage in the manufacture of malleable and brass castings and various safety appliances. It is understood that a new brass foundry is being erected and equipped.

The Baldwin Locomotive Works has received orders for 144 freight locomotives for the Pennsylvania Rail-

road and five engines for the Missouri Pacific. The various Baldwin plants are fully engaged, and while the outlook for a continuance of active conditions is looked for, no plant extensions are contemplated. Plans in connection with its proposed Western plant are still undecided.

## Chicago

CHICAGO, ILL., March 18, 1913.

Alvin C. McCord, president of the Chicago Steel Company, Peoples Gas Building, Chicago, has acquired for occupancy by that company the plant of the Mason & Davis Range Company at Grand Crossing. It will be enlarged and provided with additional facilities.

James S. Kirk & Co., Chicago, have purchased a tract of five acres on the North branch of the Chicago River upon which a factory building will be erected.

The Warren Motor Boat Mfg. Company, Chicago, has taken out a permit providing for the erection of a factory 45 x 100 ft., one story, to cost \$8,000.

The Boylston Steam Specialty Company, Chicago, has been incorporated with a capital stock of \$50,000 to manufacture steam, air and water specialties by John Boylston, 4526 Malden street, H. J. Richter and John Boylston, Jr.

The Track Necessities Company, Chicago, has been incorporated with a capital stock of \$5,000 for the purpose of manufacturing and dealing in railroad supplies by L. C. Hurley, 343 South Dearborn street, H. A. Fischer and R. Y. Hoffman.

The Galesburg Writing Machine Company, Galesburg, Ill., has been organized with a capital stock of \$100,000 to manufacture typewriters and office appliances, the incorporators being C. T. Childers, H. A. Bates, A. H. Childers and G. H. Bates.

The Northern Steel & Concrete Company, Freeport, Ill., organized with a capital stock of \$5,000 by F. M. Cheeseman, Scott Deaner and Robert Cheeseman, will engage in a general contracting and construction business.

The Moline Scale Company, Moline, Ill., is planning the extension of its plant to provide additional foundry capacity for both brass and gray iron.

The Sioux City Artificial Ice Company, Sioux City, Iowa, for whom a new plant has already been completed, has been incorporated with a capital stock of \$25,000. A. D. Robinson is president.

The United States Bedding & Spring Company, St. Paul, Minn., has had plans prepared for a new factory in that city to be 120 x 160 ft., three stories.

The Union Brass & Metal Company, St. Paul, Minn., has taken out a building permit covering the erection of an addition to its foundry and machine shop 70 x 120 ft., one story, to cost \$12,000.

Henry Orme's Sons, iron and brass founders, St. Paul, Minn., are planning an extension to their Washington foundry 70 x 100 ft. They have made improvements to their manufacturing facilities by the addition of a 50-hp. motor, two air compressors and four molding machines and have still to purchase two or three air hoists and other air tools.

## Detroit

DETROIT, MICH., March 18, 1913.

The general tone of the local machinery market continues healthy, although current sales show a slight falling off as compared with those of last week. Inquiries are fairly numerous and cover a wide range of equipment. Local dealers report that the automobile accessory and parts markets are responsible for a considerable amount of current business. There have been a number of companies formed locally in the present year to engage in this line of manufacture and several existing plants are making additions. Makers of sheet metal stampings report an excellent volume of business with an increase of output of from 10 to 25 per cent. over last year. The foundry trade is in excellent condition and a statement from a local manufacturer of foundry supplies that for the first two months of the present year there has been an increase of 50 per cent. in his business over that of the corresponding period of 1912 is interesting. Contractors are better engaged.

The Tribune Motor Company, Detroit, has been incorporated with a capital stock of \$10,000 to manufacture automobiles. Louis G. Hupp and George J. Baker are the principal stockholders. A temporary factory at 807 Scotten avenue has been arranged for, pending the

erection of a permanent plant. It is expected that the capital stock will soon be largely increased.

The plant formerly occupied by the Detroit Twist Drill Company at Bellevue and Warren avenues, Detroit, has been sold to William F. Evans, Milwaukee, Wis., who is organizing a company to manufacture automobile accessories. The entire factory, 40 x 160 ft., will be utilized.

The molding plant of the Aluminum Castings Company, Detroit, was destroyed by fire March 9, entailing a loss of \$10,000. A new structure will be erected.

The Supreme Pattern & Foundry Company, Detroit, has been incorporated with \$10,000 capital stock to operate a pattern shop and foundry. The incorporators are Otto C. Schenck, William Rengert and Julius Grunow.

The Motor Foundry Company, Detroit, has increased its capital stock from \$30,000 to \$100,000 to provide for increasing business.

The Goodspeed-Detroit Mfg. Company, Detroit, has taken out a permit covering the erection of a brick factory building 48 x 154 ft., one story, to cost about \$6,000. The company manufactures automobile accessories.

John W. Murray, Detroit, has acquired a plant containing about 20,000 sq. ft. of floor space at Clay avenue and the Michigan Central Railroad and will equip it for the manufacture of automobile fenders.

The Daigle-Steger Steel Company, Detroit, has taken out a building permit to erect a brick and steel factory 93 x 150 ft., one story, at Fort and Twelfth streets, to cost \$10,000.

The Superior Motor Company, Detroit, has been incorporated with a capital stock of \$100,000 to manufacture a gasoline engine of new design invented by Harry Fraser. The new company has secured temporary offices at 714 Chamber of Commerce.

The MacKinnon Boiler & Machine Company, Bay City, has acquired a site of five acres on Garfield avenue, adjoining the Pere Marquette Railroad, on which it is planned to erect an entire new plant. Details of construction and equipment are not yet available.

The Motor Specialties Company, Muskegon, Mich., has been reorganized and the following new officers elected: John W. Wilson, president; W. McLaughlin, vice-president, and Frank C. Whitney, secretary-treasurer. Some additions to equipment may be made.

Herbert L. Haight, Lansing, Mich., is interested in a new \$50,000 corporation which is being organized to manufacture gasoline vending machines and other garage accessories.

The Stitch-Address Company, Kalamazoo, Mich., has been incorporated with \$100,000 capital stock to manufacture a sealing and addressing machine. A plant will be equipped at once. Percival J. Cox is among those interested.

The Wilcox-McKim Company, Saginaw, Mich., has been incorporated with \$125,000 capital stock to manufacture steering gears, universal joints and other automobile accessories. The company has acquired a site of about four acres for its plant and will at once proceed with the erection of several buildings, including a machine shop 120 x 210 ft., heat treating building, etc. The plant will be equipped throughout with new machinery and it is planned to use electric power. Merrill M. Wilcox is secretary-treasurer of the new company and will be the active manager.

James McGregor, Pontiac, Mich., is at the head of a new concern to be known as the Pontiac Bridge & Boiler Company. The company will manufacture fire escapes, bridges, etc., and a factory will be erected at once.

The National Fence Company, Battle Creek, Mich., has been incorporated with \$50,000 capital stock to manufacture wire fencing. The incorporators are H. H. Hunter, C. C. Miller and H. H. Batdorff.

The Bent Rim Company, Lowell, Mich., is enlarging its plant by the erection of an addition 50 x 50 ft. and two stories.

The Buick Motor Company, Flint, Mich., has awarded the contract for the erection of a new brass foundry to replace the one destroyed by fire in January.

The Sparks-Withington Company, Jackson, Mich., manufacturer of roller bearings and pressed metal products, has increased its capital stock from \$200,000 to \$300,000.

F. R. Fisher, Three Rivers, Mich., is erecting a factory for the manufacture of cement silos.

The Owosso Sugar Company, Owosso, Mich., has increased its capital stock from \$1,250,000 to \$1,875,000.

The Weston-Mott Company, Flint, Mich., manufacturer of automobile axles, is planning the erection of a new heat treating building. The plans call for a one-story building 75 x 325 ft., of saw tooth design.



## Cleveland

CLEVELAND, OHIO, March 18, 1913.

Conditions in the machinery trade are very satisfactory. In the first few days of the month there was some falling off in orders, but the demand for single tools is again active. No new lists of large size came out in the week, but a large amount of work is in prospect in miscellaneous business. The Lake Shore Railroad will be in the market shortly for machinery equipment for its car repair shops at Air Line junction, Ohio. The demand in the foundry trade continues heavy and consumers are having trouble in securing castings wanted for early delivery.

The city of Cleveland is in the market for the following wood-working machines for the Department of Correction, Warrensville, Ohio, bids for which will be received at the offices of the Director of Public Safety, Cleveland, March 26:

One 16-in. band joiner with 3 h.p. motor.  
 One 36-in. planer, with 15 h.p. motor.  
 One universal double circular saw with 5 h.p. motor.  
 One double spindle shaper with 5 h.p. motor, balance correct.  
 One tenoning machine with rear cut off saw attachment, 5 h.p. motor.  
 One automatic vertical hollow chisel mortiser with 3 h.p. motor.  
 One belt sander with 3 h.p. motor and with full equipment of sand belts and necessary accessories.  
 One 24-in. heavy roughing planer—second-hand—with 10 h.p. motor.  
 One 15 h.p. motor to drive line shaft

The Chisholm & Moore Mfg. Company, Cleveland, has placed a contract for the erection of a factory addition 50 x 80 ft., two stories and basement. It will be of brick and concrete construction and will be used for a core room and storage building to take the place of a portion of the plant which was recently burned.

The Dover Fire Brick Company, Cleveland, will shortly begin the erection of a new brick-making plant at Strasburg, Ohio. Power equipment and brick-making machinery will be required.

The Madison Foundry Company, Cleveland, has placed a contract for the erection of an addition to its plant.

The Thompson Electric Company, having outgrown its former quarters at 337 Superior avenue, N. W., has moved its offices and assembling shop to 102 St. Clair avenue, N. W., Cleveland, Ohio.

The Rapp Mfg. Company, Toledo, Ohio, has changed its name to the Toledo Spark Plug Mfg. Company and increased its capital stock from \$15,000 to \$25,000. The company will increase its factory space in the Toledo Factories Building where it is located to three times its present space. The additional capital, it is stated, will be used in purchasing new machinery.

The Knox Pressed & Welded Steel Company, Niles, Ohio, has prepared plans for a new plant to replace the one recently burned. The plans call for a steel reinforced concrete building 160 x 300 ft., three stories, with a wing 40 x 100 ft. The plant will be equipped with a 25-ft. crane. In addition a two-story brick office building will be erected.

The Scott-Ullman Company, Cleveland, manufacturer of electric light fixtures, has purchased a new site on Perkins avenue N. E., on which it plans to erect a four-story factory building.

The city of Cleveland will establish a machine shop for repair work in connection with the fire department. A building will be erected for that purpose on Croton avenue near Broadway. An expenditure of \$30,000 for building and equipment is planned.

The J. A. Cochrane Brass Mfg. Company, Cleveland, Ohio, has been incorporated with a capital stock of \$20,000 by John A. Cochrane, David A. Cochrane, John A. Maehrer and others.

The Factory Products Company, Ashtabula, Ohio, has been incorporated with a capital stock of \$10,000 to deal in iron, steel, coke, rubber, copper, etc. Among the incorporators are A. H. Pentius, E. P. Hall, S. E. Hall and others.

A new plant for the manufacture of aluminum articles will be built in Shreve, Ohio, by the Maiwurm German Aluminum Company, which was recently organized with a capital stock of \$150,000.

The Imperial Brass Foundry & Mfg. Company, Painesville, Ohio, has been incorporated with a capital stock of \$50,000 by C. M. Ludlow, R. A. Groch, G. E. Kirkman and others.

The W. M. Pattison Supply Company, Cleveland, Ohio, dealer in machinery and supplies, has increased its capital stock from \$50,000 to \$150,000. A portion of the increase will be used for adding two stories to its supply warehouse at Fortieth street and Hamilton

avenue. The company plans the erection next year of sales room in the downtown district on Ruskwell avenue, N. E.

The Callaghan Machine & Die Company, Canton, Ohio, has been incorporated with a capital stock of \$6000 by W. E. Callaghan, A. L. Menegay, C. G. Herbruck and others.

A. C. Heacock and James H. Hotchkiss have purchased the controlling interest in the Aluminum Foundry Company, Sebring, Ohio. The company manufactures aluminum castings and kitchenware. It is stated that the capacity of the plant will be increased.

C. E. Sears & Co., Circleville, Ohio, will erect a large mill, elevator and steel grain storage bins. Power and milling machinery will be required.

Lorain, Ohio, will enlarge its municipal water works plant and it is stated will install two new boilers.

The Canton Drop Forging & Mfg. Company, Canton, Ohio, is making additions to its manufacturing facilities which will increase its output 25 per cent. It recently increased its capital stock from \$25,000 to \$150,000.

## Cincinnati

CINCINNATI, OHIO, March 18, 1913.

The situation with machine tool builders is unchanged, with the possible exception of an improvement in the export trade. Practically all plants are operating to full capacity, and two or three are running night shifts. Railroad buying is slack and is confined mostly to single tools for replacements. Second-hand machinery dealers, as a rule, report better prospects than at this time last year, although their business is not up to normal. Boiler and tank companies, manufacturers of electrical equipment, as well as gas engine builders, are all very busy.

The Tool Steel Gear & Pinion Company, Carthage, Ohio, announces that it has changed its plans for building an addition to its present plant, as was previously reported. It has acquired a site in Reading, a Cincinnati suburb, on which it will erect a large plant that will greatly increase its output.

The Safety Emery Wheel Company, Springfield, Ohio, contemplates some extensive additions to its plant in that city. Nothing is yet known as to the machinery requirements.

C. Arns, Glendale, Ohio, a Cincinnati suburb, has completed the erection of a large garage and repair shop, and will soon be in the market for a number of small machine tools.

The Cleaners' Supply & Equipment Company, Cincinnati, is fitting up a plant for the manufacture of special laundry machinery. L. A. Booth and E. W. Griffin are interested in the company.

W. J. Durrell, Pickering Building, Cincinnati, is interested in a new company that will soon be in the market for quarrying machinery and conveying apparatus for developing extensive lime deposits in Wisconsin.

The Trimble Paving Brick Company, Dayton, Ohio, is a new incorporation with \$350,000 capital stock, to manufacture paving brick and other clay products. R. T. Baker and J. H. Simpson are named among the incorporators.

The Boob Wheel Company, Cincinnati, maker of automobile and wagon wheels, will move from its present location on Freeman avenue to a larger building on Sycamore street. Extra woodworking and other equipment will be required to fit up the new plant.

At a recent meeting of the stockholders of the John Steptoe Shaper Company, Cincinnati, it was decided to change the company's name to the John Steptoe Company. In addition to its regular line of shapers, the firm is now building other kinds of machine tools.

The Middletown Sheet Metal Works, Middletown, Ohio, is a new partnership formed by William Elters and Joseph Sweeney for the purpose of operating a sheet metal shop. In the list of the company's requirements will be several punches and shears and other metal working machinery.

The Bahmann Iron Works Company, Winton place, Cincinnati, has purchased a large manufacturing building at Spring Grove avenue and Alabama street, that will be fitted up for the manufacture of sugar, rice and coffee machinery. The company has a rapidly increasing export business which necessitated this move.

The Indestructible Sign Company, Columbus, Ohio, whose incorporation was recently noted, will probably be in the market soon for additional metal working machinery and electric motors for a proposed addition to its plant.

The P. A. Sorg Paper Company, Middletown, Ohio, has plans prepared for an additional paper manufacturing plant, to be erected on Main street.

The Climax Machine Company, Columbus, Ohio, has been incorporated with \$10,000 capital stock, to manufacture patented specialties. Edward P. Rickert is one of the principal incorporators. Nothing is known as to the company's machinery requirements.

The Snider Mfg. Company, Logan, Ohio, has had plans prepared for rebuilding its furniture factory, recently destroyed. In addition to a large quantity of woodworking machinery, a number of electric motors will be required.

## Indianapolis

INDIANAPOLIS, IND., March 18, 1913.

The Link-Belt Company, Indianapolis, is preparing for an additional plant, to make malleable castings for use in its factories there and in Chicago and Philadelphia. The tract on which the new plant will be located consists of 33 acres, about 14 of which will be occupied. There will be two main foundry buildings, each with four malleable iron air furnaces, other furnaces to be added later. An annealing building will contain 12 annealing ovens. There will be an annealing pot foundry, a trimming and grinding shop, a general shop building, containing machine shop, carpenter shop, pattern shop and smith's shop; a core-house building, heating and power plant and several smaller buildings. All buildings will be of most modern construction and equipment, one story. The capacity at the start will be 600 to 700 tons a month, running eight furnaces. Each molder will have an outside window. The plant will be known as the Belmont Works of the Link-Belt Company, and the output will be entirely for the company.

The Metallic Batten Company, Owensville, Ind., has been incorporated with \$10,000 capital stock, to manufacture metallic batten strips. The directors are George E. Daugherty, William C. Benson, Grant Teel, L. F. Weldon and Albert W. Thompson.

The Clinton Construction Company, Frankfort, Ind., has been incorporated with \$25,000 capital stock, to construct heating, lighting and similar plants. The directors are George V. Moss, George H. Brannon and Markwood Slipper.

The Date-Mode Tire & Tube Company, Gas City, Ind., has been incorporated with \$5,000 capital stock to manufacture automobile tires. The directors are M. J. Hontz, O. V. Shober and J. L. Hontz.

The Inland Steel Casting Company, Terre Haute, Ind., whose core room was recently destroyed by fire will rebuild that part of its foundry at once.

The Hercules Gas Engine Company, Evansville, Ind., has had plans prepared for a new plant and is about to ask bids on the construction.

The Princeton Material & Construction Company, Princeton, Ind., has been incorporated with \$5,000 capital stock, to manufacture cement products. The directors of the company are O. A. Ross, Jedde Kern and W. H. Miller.

B. G. B. Slaymaker has been appointed receiver for the American Pipe Organ Company, Anderson, Ind.

The Empire Paper Company, Vincennes, Ind., will make an addition to the plant to cost \$60,000. The new machine room will contain a machine for making lightweight strawboard. The parcel post has created a great demand for corrugated cartons.

The Plymouth Electric Light & Power Company, Plymouth, Ind., has been incorporated with \$100,000 capital stock, to operate a heat, light and power plant. The directors are Charles D. Virginia and Isaac Snorborger.

The Western Supply & Wrecking Company, Bluffton, Ind., has increased its capital stock from \$35,000 to \$50,000.

## Milwaukee

MILWAUKEE, WIS., March 17, 1913.

The machinery situation is considered very satisfactory but without especial feature, and prospects are that it will continue so until early summer. Milwaukee machine tool builders are busy following up inquiries which have been coming in for several months. The workshops are being operated to capacity to execute orders already booked and a scarcity of skilled and competent labor is felt here. There are a large number of industries throughout the state of Wisconsin which are making conservative extensions and are putting out inquiries for small lots of tools. No large lists are in prospect excepting the Four Wheel Drive automobile interest at Clintonville, Wis., which is putting \$200,000 or more

into a complete new establishment. Other automobile and motorcycle interests in Milwaukee and elsewhere are small-lot buyers.

The Four Wheel Drive Automobile Company, Clintonville, Wis., which recently increased its capital stock from \$75,000 to \$250,000, has decided to establish a new plant which with full equipment will cost approximately \$200,000. Plans for the buildings are ready for bids and call for two large shop buildings, each 100 x 120 ft., part two stories, of reinforced concrete and steel construction, with a power plant 60 x 80 ft., of concrete and brick. Its present quarters will be used for patterns and other storage when the new plant is completed. The principal product is a commercial motor vehicle of 3½ tons capacity embodying the Zachow-Besserdich application of power to all four wheels. The car is also built in pleasure car and omnibus types.

The Wausau Brewing Company, Wausau, Wis., has been incorporated with a capital stock of \$125,000. The incorporators are E. W. Krause, Nicholas Vesser and August F. Marquardt. The company is at present constructing a new plant, and while the principal brewery equipment and most of the power units have been purchased a miscellaneous assortment will be called for as the construction work reaches the proper stage of completion.

F. F. Jackson, a general contracting engineer with headquarters at 712 Majestic Building, Milwaukee, has organized the Lakeside Bridge & Steel Company, which has been incorporated with an authorized capital stock of \$25,000. W. W. Oefflein and T. J. Baker are associated in the enterprise.

Louis Hamilton and C. H. Beach, the principal owners of the Hamilton-Beach Mfg. Company, Racine, Wis., producer of electrical specialties, have organized the Wisconsin Electric Company, Racine, which is incorporated for \$50,000. Details are not as yet available.

The city of Wittenberg, Wis., is having estimates and plans made for a municipal waterworks system for the construction of which a bond issue of \$40,000 was recently voted. W. G. Kirchhoffer, Madison, Wis., is consulting engineer.

The C. Peterson Construction Company, Kenosha, Wis., has filed articles of incorporation. The capital stock is \$10,000 and the incorporators are Christ. Peterson, William J. Boyle and P. J. Hurtgen.

The Standard Aluminum Company, Two Rivers, Wis., has definitely decided to establish a rolling mill and will soon begin work on a two-story structure 40 x 160 ft.

The Aluminum Goods Company, which operates large plants at Two Rivers and Manitowoc, Wis., will enlarge both. A \$40,000 addition will be made to the Manitowoc works, and at Two Rivers a concrete building 60 x 100 ft. will be erected. At present 180 are employed in Manitowoc and this number will be increased to 250 when the building is completed.

The Wisconsin Aluminum Foundry Company, Manitowoc, Wis., which was reported to be looking for a new location, has been induced to remain in Manitowoc through the efforts of the Citizens' Association. The association has provided a site for a new plant and sufficient acreage for future additions and a new factory 75 x 200 ft. will be erected at once.

Fred Sprinkmann & Son, 266 East Water street, Milwaukee, manufacturing steam-pipe and boiler covering, magnesite and asbestos goods, has leased a large factory building at South Milwaukee and will greatly enlarge its scope. The present quarters in Milwaukee will be used as warehouse and principal offices.

The Paramount Metal Drying Form Company, Beaver Dam, Wis., recently organized a subsidiary of the Paramount Knitting Company of Chicago, will manufacture metal forms for drying and dyeing hosiery. No extensive manufacturing operations are contemplated by the new concern.

The commissioner of public works, Milwaukee, Wis., will receive bids until April 16 for the construction of the proposed new municipal waterworks intake tunnel at Linwood avenue. The tunnel will extend 4000 ft. into Lake Michigan and will be 12 ft. in diameter, with a capacity of 250,000,000 gal. every 24 hours. The estimated cost is \$400,000. Plans were executed by J. A. Mesiroff, city engineer.

The Allouez Bay Dock Company, Superior, Wis., has increased its capital stock from \$100,000 to \$400,000. The amendment is signed by Louis W. Hill, president, and J. H. Gruber, secretary.

The Kaukauna Farm Implement Company, Kaukauna, Wis., has been incorporated with a capital stock of \$6,000 by J. T. Timmers, John Adams and H. Siebert.

The McKenzie Mfg. Company, La Crosse, Wis.,

has secured a site in that city upon which it will erect a factory for the manufacture of farming implements.

The Badger Foundry Company, Racine, Wis., has completed an addition to its plant.

The Reiss Coal Company, Sheboygan, Wis., has purchased the Western Coal & Dock Company, of Waukegan, Ill., and contemplates extensive improvements in the plant and handling equipment.

The Alexander M. Kailing Company, Milwaukee, has been formed with a capital stock of \$25,000 to manufacture electrical machinery. The incorporators are A. M. Kailing, P. J. Kailing and E. F. Gauerke.

## St. Louis

St. Louis, Mo., March 17, 1913.

The machine tool market is showing no retrogressive steps, and while the activity of business is not all that representatives would like to have it, it nevertheless is presenting an encouraging aspect, with the result that there is a belief that the spring will develop additional activity. No large lists are coming out, but the totals are good and there is a generally good feeling prevalent. Collections are reported satisfactory, while the reports which are coming in as to crop conditions in tributary territory help to improve the morale of the market.

The State Legislature of Missouri has passed an appropriation of \$50,000 for a brick manufacturing plant to be installed at the Jefferson City penitentiary. Convicts are to be employed therein and the plant enlarged as the labor contracts under which they are working expire under the State law ending contract labor in the prison.

The Scarrit-Comstock Furniture Company, St. Louis, has leased the buildings formerly occupied by the Hafner-Lothman Mfg. Company and will equip them for the manufacture of furniture. The equipment will be adapted to the use of electric power from the Keokuk dam as soon as it is delivered in St. Louis. Much other new equipment will be added.

The Springfield and Central Southern Illinois Traction Company has obtained franchises in all the cities through which it will pass from Springfield to DuQuoin and construction work will begin shortly on track and power houses.

By a public vote St. Charles, Mo., has given a franchise to the Mississippi River Power Distributing Company, which will handle the Keokuk hydro-electric current to equip that city for the use of that current when ready for delivery.

The Luyties Pharmacy Company, of St. Louis, has placed plans in the hands of contractors for bids for the construction and equipment of a large factory building for the extension of its manufacturing equipment.

The St. Louis Motion Picture Company, O. E. Gobel, president, has plans for the doubling of the equipment and space of the plant at St. Louis.

The Brecht Supply Company, St. Louis, has completed plans for the construction of a plant for the manufacture of cans. The equipment, exclusive of the building, will cost about \$60,000.

The Hummel Mining & Investment Company, with \$10,000 capital stock, has been incorporated at St. Louis by A. G. Hummel, of Truesdale, Mo.; E. P. Porter and C. K. Reifsnyder of St. Louis to equip and develop ore property owned by them.

The Perry Chemical Company, St. Louis, with \$20,000 capital stock, has been incorporated by John G. Victor, J. and L. B. Weber, to equip a plant for the manufacture of chemicals.

The Independence Laundry Company, Independence, Mo., with \$30,000 capital stock, has been incorporated. It will equip a plant at once. The stockholders are L. H. Fisher, Kansas City; F. W. Porter, Kansas City, and J. J. Mackin, Independence.

The Beardstown Public Service Company, Beardstown, Ill., with \$200,000 capital stock has been incorporated by Thomas K. and Floyd M. Condit, and Robert B. Glenn, and will equip and operate public service electric and water plants.

The Little River Lumber Company, Caruthersville, Mo., with \$25,000 capital stock, has been incorporated by H. W. Barrick and Glenn and R. E. Frye to equip saw and planing mills to be operated by them.

The Galesburg Writing Machine Company, Galesburg, Ill., with \$100,000 capital stock, has been incorporated by Charles T. Childers, Harry A. Bates, A. H. Childers and G. H. Bates to equip a plant for the manufacture of a patented machine.

The St. Louis Rubber Mfg. Company, St. Louis, with \$10,000 capital stock, has been incorporated by James

A. and Paul F. Mulherin and George P. Dougherty to manufacture rubber goods.

The Universal Smokeless Fuel Company, St. Louis, with \$50,000 capital stock, has been incorporated by James M. Moran, Asa A. Loudon and Alfred Mueller of Wellston, a suburb, and will equip a plant to manufacture smokeless fuel by a secret process.

The Norwood Canning & Mfg. Company, with \$25,000 capital stock, under the management of L. W. Blount, is erecting its building and reports itself in the market for machinery.

The Pontotoc Brick, Tile & Stone Company, Ada, Okla., incorporated by W. M. Van Zandt and others of Oklahoma City, Okla., will equip a plant of 30,000 bricks daily capacity.

The Belt Coal Company, Blocker, Okla., with \$25,000 capital stock, has been incorporated by James L. Brazzell, of Hartshorn, Okla.; Al Belt and R. P. Harris of Fort Smith, Ark., and will equip mining property at Blocker.

The Petrous Mfg. Company, Biloxi, Miss., with D. G. Ziegler manager, has plans for the installation of considerable additional equipment to increase its capacity.

The Farmers Ginning Company, with \$8,000 capital stock, has been incorporated by S. O. Richardson, C. E. Kennedy, H. A. Sadler and W. B. Vaughn, and will equip a ginny at once.

The Pine Bluff Hotel Company, Pine Bluff, Ark., will install a \$12,500 electric plant in the hotel now being built by the company.

The N. S. Sherman Machine & Iron Works, Oklahoma City, Okla., has been awarded at about \$70,000 the contract for the construction and equipment of the electric light plant and water works at Wynne, Ark. R. C. Huston, of Memphis, Tenn., is engineer in charge.

The Southern Heat & Light Company has bought the C. C. Johnson plant at Jennings, La., and will spend about \$10,000 in extending the generating equipment.

The city of Joplin, Mo., will vote April 15 on a \$60,000 bond issue to provide for a 500-hp. addition to the electric light plant.

The Williamsville Roller Mill Company, Williamsville, Mo., will install a 75-barrel-per-day mill, with cornmeal equipment also. It will be operated by electric power.

A 40-barrel flour mill is to be built at Sparta, Mo., by the John F. Meyer & Sons Milling Company and Samuel McCrackin of Springfield, Mo.

The Festus Glass Company, Festus, Mo., recently incorporated with \$40,000 capital stock, will build a plant at once for the manufacture of 300 gross daily of machine and hand blown bottles. Edward Kerrish is president and H. S. Warrick manager.

The Thomas Railway Appliance Company, Guthrie, Okla., with \$100,000 capital stock, has been incorporated by John W. Thomas, of Kansas City, Mo.; J. R. Hamill and Fred W. Green, of Guthrie, Okla., and will equip a plant at once.

The Broom Corn Baler & Seeder Company, Enid, Okla., with \$100,000 capital stock, has been incorporated by I. P. Cline, E. A. Butler and S. L. Cline, and will equip a plant to manufacture its device.

The recently reported glass plant for Sapulpa, Okla., involves the removal there of The Sunflower Glass Company, Coffeyville, Kans., and the Cheyenne Glass Company, Caney, Kans., together with the addition of new equipment.

The Ford Motor Company, Detroit, Mich., will increase the capacity of its assembling plant at Kansas City, Mo., and add considerable equipment.

W. H. Standish, of Aurora, Mo., and others have plans for the construction and equipment of a hydro-electric plant on the James River near Galena, Mo.

Bids will be received until March 28 for the construction and equipment of waterworks in District No. 3 at Clarksville, Ark. Winters & Dove, of Fort Smith, Ark., are the engineers.

The Gap Lumber & Stave Company, Caddo, Ark., with \$20,000 capital stock, has been incorporated by W. B. Barton, L. J. Witherspoon, P. Cobb and others and will install equipment shortly.

The Wyandotte Tripoli Company, Miami, Okla., recently incorporated with \$300,000 capital stock, will develop tripoli deposits at Wyandotte, with 50-ton plant as initial unit. Bids will be opened April 1. J. P. McNaughton is president.

The American Light & Power Company, St. Louis, with \$10,000 capital stock, has been incorporated by W. W. McCurdy, A. E. Reinhard, C. P. Reinhard and L. M. McCurdy, all of Union, Mo., who will equip a public service electric plant at that place.

The flouring mill of the Reids Milling Company at Carthage, Mo., was burned March 14 with a loss on



building and machinery of \$35,000. The plans as to equipment have not been announced.

The Charles Tenon Machine Company, Sapulpa, Okla., with \$6,000 capital stock, has been incorporated by Charles E. Volk, Charles C. Cox, W. L. Evans and Louis Johnson. A plant will be equipped.

The Standard Machine Mfg. Company, Carthage, Mo., has increased its capital stock from \$30,000 to \$60,000 and contemplates the enlargement of its shop and the installation of additional machinery.

The Carthage Machine Company, Carthage, Mo., has increased its capital stock from \$30,000 to \$60,000 and will erect and equip a building 50 x 150 ft., of brick construction.

The Central Broom Mfg. Company, Conway, Ark., recently incorporated with \$10,000 capital stock, is in the market for equipment for 75 dozen daily capacity.

The Ark-Ol Mfg. Company, Pine Bluff, Ark., organized to manufacture products from lignite coal, has made John Holmes general manager, and will equip its plant at once.

## The Central South

LOUISVILLE, Ky., March 18, 1913.

Business conditions in this territory are quite favorable to machinery manufacturers and dealers, and trade is progressing in a satisfactory manner. Factory operations are on a full-time basis, and many existing plants are being enlarged, while a considerable number of new enterprises requiring machinery are being put on foot. There is a good demand for power equipment, and elevators and conveying machinery generally are selling without difficulty. Seasonable weather conditions are now prevailing, and this is helping all lines of trade. The outlook for the remainder of the spring is altogether satisfactory.

George H. Gray, Louisville, has plans for the new reinforced concrete addition to the tannery of William Schuff & Co., 811 South Twelfth street. No additions to the power equipment will be needed, probably, but a lot of hoists, conveyors and special leather-working equipment will be purchased. The building will be equipped with steel sash and otherwise designed with fire protection in mind.

The James Clark, Jr., Electric Company, Louisville, reports an excellent demand for motor-driven machine tools. A number of motor sales have been made recently, including several to the Ballard & Ballard Company, for use in its packing department.

Brinton B. Davis, Louisville, is now receiving bids on the 9-story reinforced concrete warehouse of the Standard Sanitary Mfg. Company in this city. After the building contract is let orders will be placed separately for the equipment, including two 100-hp. boilers, a pump, electrically operated elevators, conveying equipment and transmission machinery.

The Kentucky Wagon Mfg. Company, Louisville, which has been developing a department for electric trucks, has installed it in a separate building 150 x 200 ft. and has been adding a considerable amount of new equipment. Further enlargements in the way of machine tool installations will be made from time to time. H. B. Hewett is manager of the department.

The W. J. Gillette Mfg. Company, Louisville, which operates a plant for the production of carriage and wagon woodstock, has purchased a 100-hp. boiler from the Henry Vogt Machine Company, Louisville, and will probably require additional woodworking machinery in the near future.

Peter Jacobson & Sons, Louisville, whose furniture factory was recently burned, will be in the market for woodworking equipment as soon as the location of the new plant is decided on. The power equipment is in good shape, it is stated, and will not be replaced.

The Graf Stove & Range Company, 625 East Main street, Louisville, which is now operating a plant for the assembling of stoves, will probably install a foundry and undertake all of the manufacturing processes later on. H. J. Graf is president.

Rush C. Watkins, Norton Building, Louisville, is in the market for a limestone grinding plant, the product to be used for fertilizer.

The Louisville Water Company has decided upon the addition of a 36-in. main, which will run through the southern part of the city. The construction of this main will cost in the neighborhood of \$400,000. Theodore Leisen is chief engineer.

The Louisville Cereal Mills Company is putting in some new milling machinery and will require additional equipment of this kind later. L. C. Ewing is president.

Edward Ballard, West Baden, Ind., is to construct a pumping station for use in connection with a 500,000-gal. reservoir shortly to be erected.

John Gienger & Co., Jeffersonville, Ind., are to erect a grain elevator with a daily capacity of 10,000 bushels.

In addition to purchasing new boilers for the Indiana reformatory at Jeffersonville by virtue of an appropriation for that purpose which has just been authorized, D. C. Peyton, superintendent of the institution, has also available \$16,000 for the establishment of a new trade school, which will require special equipment of various kinds.

The engineering department of Kentucky State University at Lexington is preparing to establish a course in automobile engineering, which will require the erection of a new building and the purchase of machine tools and other equipment.

The Mt. Sterling Laundry Company, Mt. Sterling, Ky., is to occupy a new building in the near future and will install a large amount of new machinery. R. M. Pollard and A. C. Tipton own the laundry.

Mowbray & Robinson and the Kentucky Hardwood Lumber Company, which are operating large mills in Breathitt County, Ky., have secured timber lands along the Lexington & Eastern extension in Perry and Letcher counties and will install additional sawmills. The companies have their headquarters in Cincinnati, Ohio.

The Bourbon Tobacco Warehouse Company, Paris, Ky., is completing the equipment of a large warehouse and is in the market for presses, an elevator, etc.

The Board of Public Works of Madisonville, Ky., will open bids April 2 for the construction of a water system for which bonds were issued some time ago. A large standpipe and reservoir are to be constructed. The pumps and other machinery will be bought in the near future.

The Old-Way-Made-Easy Churn Mfg. Company, Paducah, Ky., has been incorporated with \$24,000 capital stock by W. H. Colman and others for the manufacture of a patented churn. Part of the plant of the Fooks Lumber Company will be used at first, but it is planned to equip a separate factory in the near future.

The Commercial Club of Ashland, Ky., can give details of a glass factory which will be located there or at Charleston, W. Va.

George T. Hambrick and Emil Peters, Georgetown, Ky., are considering plans for manufacturing an improved shaft coupling for which they have been awarded a patent.

The Cropper Laundry Company, Lexington, Ky., is to occupy a new building in the near future and will be in the market for power and special equipment.

The Hazard, Ky., Light & Power Company has been incorporated with \$10,000 capital stock by W. E. Hemphill, B. P. Wooten and J. T. Lovelace, and will install a plant with a capacity of 240 hp. Water power may be used, as a site on Messer branch has been secured with this in view.

The Cumberland Motor Company, Pineville, Ky., has been incorporated with \$50,000 capital stock by N. J. Weller, A. W. Bryant and John A. Pitman. As heretofore reported in *The Iron Age*, this company is erecting a plant for the manufacture of a patented spring motor to be used on sewing machines.

Henley V. Bastin is in charge of the erection of an ice factory at Lancaster, Ky.

J. M. Riley has been awarded a franchise for the installation and operation of an electric light plant at Williamstown, Ky., and will proceed with its construction in the immediate future.

R. D. McReynolds, Park City Milling Company, Bowling Green, Ky., will purchase electric motors for the operation of his mill, having decided to do away with the steam plant and depend on central station service.

The Evans Motor Car Company, which is being organized at Nashville, Tenn., with \$200,000 capital stock, has secured an eight-acre site six miles from Nashville and is planning the construction of a factory building 250 x 300 ft., three stories. R. H. Evans is organizing the company.

The John P. Dale Machinery Company, Nashville, Ky., has sold an engine to the McMinnville, Tenn., Spoke & Lumber Company, a Universal woodworker to the Lewisburg, Tenn., Carriage Company, and a sawmill to Lee & Fisher, Sparta, Tenn.

The Cumberland Motor Car Company, Nashville, Tenn., is completing the erection of a garage and will proceed with the equipment of a repair shop.

E. Nicks, Nashville, Tenn., is building a garage at 112 Woodland street. A feature will be an unusually extensive repair department.

The Richmond Forgings Company, Richmond, Va., manufacturer of drop forgings, is making considerable additions to its equipment for the manufacture of heavy forgings.

## Birmingham

BIRMINGHAM, ALA., March 17, 1913.

Reports from dealers in machinery and machine tools continue to show a satisfactory volume of business owing to the great amount of construction that is going on in a number of fields, while a large variety of goods is called for. Gasoline engines are good sellers.

W. Zode Smith, manager of the Atlanta municipal water plant, has asked for two pumps, one of 20,000,000 gal. capacity and the other a 10,000,000-gal. rotary pump. The City Council will approve the request.

The Fort McCoy Cane Product Company, Fort McCoy, Fla., has been incorporated with a capital stock of \$2,500 to manufacture cane syrup. John S. Grant, J. C. Hazard, O. G. Stanbrough and others.

The Smith-Hughes Mining Company, Rome, Ga., will develop 400 acres of brown ore property. B. I. Hughes, H. T. Reynolds and others are interested.

The Standard Construction Company, Meridian, Miss., has been awarded contract to build a sawmill for H. R. Ray at Halston, Ala.

The Gadsden Pipe & Fittings Company has begun the erection of a soil pipe factory to cost \$75,000, at Gadsden, Ala., under the direction of Otto Agricola, manager. The main building is to be 75 x 260 ft., of cement and wood construction.

C. L. Patterson will establish a ginnery for sea island and upland cotton at Morven, Ga.

The Engineering & Securities Company, New York, will increase the capacity of the ice factory at Fort Myers, Fla., from 50 to 100 tons. The capacity of the electric lighting plant at Fort Myers will also be increased. H. C. Adams, Fort Myers, is local manager.

G. H. Tilton & Son will double the capacity of their knitting mill at Savannah, Ga.

The Ruskin Commongood Society, Ruskin, Fla., contemplates establishing electric lighting plant.

The city of Vidalia, Ga., will vote April 5 on a bond issue of \$25,000 for a municipal electric lighting plant.

The Van Heuvel Logging Company, Mobile, Ala., has been incorporated with a capital stock of \$5,000. It will engage in sawmill business. Martin Van Heuvel is proprietor.

Thomas M. Anthoine, Fort Valley, Ga., has formed the T. M. Anthoine Machine Works and will establish machine shop and garage.

The Black Warrior Mill Company, Andalusia, Ala., with a capital stock of \$100,000, has been incorporated to operate sawmills in Tuscaloosa County, Ala. E. L. Moore, River Falls, Ala., is president and treasurer; Cyrus A. O'Neal, Andalusia, vice-president; Henry Stanley, River Falls, secretary. Coal properties also are to be developed.

H. A. Cook, Charlotte, N. C., contemplates organizing a company with a capital stock of \$50,000 to establish a plant for manufacturing jute cotton bagging at Savannah, Ga. Savannah business men are considering the project.

The Union Oil & Fertilizer Company, Union Point, Ga., will rebuild its cotton oil mill recently burned at loss of \$37,000.

The City of Eufaula, Ala., is considering the installation of electrical pumps at the city water plant.

Florida Soil Fertility Company, Tampa, Fla., with a capital stock of \$170,000, has been incorporated to manufacture fertilizers. Charles F. Burrows, Baltimore, is president; Clarence B. Burrows, Beverly, Mass., and H. F. Borchardt, Tampa, is interested.

The city of Conyers, Ga., will build a municipal water works plant and has sold \$20,000 of bonds for the purpose.

The city of Louisville, Ala., will establish a water works, having voted a bond issue for that purpose.

Charles E. Cessna and Robert McCaskill, Santa Rosa, Fla., are organizing a company to manufacture cane syrup and can fruits and vegetables.

Stone & Webster, Boston, Mass., will build an electric power substation and distributing system at a cost of \$40,000 for the Columbus Power Company, Columbus, Ga. It will supply electric power from Goat Rock dam hydro-electric plant on Chattahoochee River.

J. G. White, of J. G. White & Co., 43 Exchange Place, N. Y., and others have bought the ice factory at St. Augustine and are reported to have bought industrial plants at Miami, Fort Lauderdale, West Palm

Beach, Palatka, Fernandina and other Florida cities at cost of \$750,000. It is believed that extensive enlargements and improvements will be made.

## The Pacific Coast

PORTLAND, ORE., March 11, 1913.

Aside from a gradual gain in small business the machine tool trade shows little change, no inquiries of a notable nature having appeared as yet. Some railroad business has been done, but the principal orders were placed in other markets. While the prospect of large transactions is uncertain a substantial increase in the aggregate is expected within the next few weeks. Shipments of mining machinery to Alaska continue heavy and some new orders are coming out, though a large part of the buying has already been done for this season. The outfitting of salmon ships also gives rise to some new business and work is under way on a number of salmon plants in the Puget Sound district and north of the Canadian line. One large fish oil and fertilizer plant is being erected on Puget Sound and efforts are being made to place machinery for the utilization of the Alaska fish waste, which is believed to offer a promising field. The greatest activity, however, is in the lumber industry. New inquiries for sawmill outfits are appearing in considerable numbers, and as the supply of logs in several places is below the capacity of the mills and the demand for lumber a heavy demand for all classes of logging equipment is fairly assured. Electric logging and mill machinery is increasing in popularity and some good orders are also being placed for electric generating equipment.

Construction of the railroad from Eugene, Ore., to open up the Coos Bay country is now well under way, and it is also reported that a railroad will be built from some main line point in Oregon to reach an important timber and copper country north of the Klamath River.

A Seattle contractor has taken building contracts for a \$100,000 powerhouse for the Earles mill near Port Angeles, Wash.

The mill of the Inland Empire Paper Company near Spokane, Wash., has closed for improvements and is to be enlarged to three times the present capacity.

Charles C. Moore & Co., San Francisco, Cal., have taken the contract for equipment in the steam plant of the Northwestern Electric Company, Portland. They will furnish six 500-hp. boilers and superheaters and two 3500-kw. turbine generators of General Electric Company make. The plant will be used as an auxiliary to the hydroelectric plant at White Salmon, Wash.

The Standard Chewelah Mining Company, Chewelah, Wash., is installing an air compressor.

A. J. Schram, formerly of the California Motor Company, Oakland, Cal., is making plans for an automobile truck factory at Bellingham, Wash.

The St. Maries Lumber Company, St. Maries, Idaho, plans to make improvements in the next year at a cost of about \$200,000.

The Miller Lumber Company is building an electric planing mill near Bend, Ore.

The leading lumbermen of Eureka, Cal., are interested in a project to manufacture pulp from redwood waste and may be in the market for machinery at any time.

Stewart Bros., local logging supply dealers, have opened a machine shop, installing lathes, shaper, grinder, drill press, boring mills, etc., and will hereafter manufacture some of their lines.

The Columbia Engineering Works has established a new office and salesroom at 53 First street, Portland.

## Texas

AUSTIN, TEXAS, March 15, 1913.

The demand for nearly all classes of machinery, particularly for irrigation pumping plants and cotton gin equipment, continues heavy. There are also favorable prospects of an unusually large number of cotton compresses and cotton seed oil mills being installed in the State in the next few months. Orders for this class of machinery are now being placed.

It is reported that the shops of the St. Louis, San Francisco & Texas Railroad are to be moved from De Quincy, La., to Beaumont, Texas. It will also enlarge its terminals at the latter place.

The McMullen Construction Company has been organized at San Antonio for the purpose of constructing railroads and bridges for railroad companies. The incorporators are S. A. Hopkins, H. E. Hildebrand, J. Frank Davis and others.

The Chamber of Commerce of Wichita Falls, is promoting the establishment there of a factory for manufacturing light glass globes and other glass articles.

The Lubbock Light & Ice Company has sold its electric light plant and ice factory at Lubbock, to John R. Cullinane of St. Louis, Mo., and associates. The properties will be enlarged and improved.

The Frankston Water & Light Company is preparing to make extensive improvements to its electric light and power plant at Frankston. Two producer gas engines and other machinery will be installed.

William Thompson and John McCallum will install a new cotton gin plant at Tabor.

Preparations are being made for the establishing at Robstown, of a large brick making plant. About \$100,000 will be invested in the enterprise.

The City Council of Kingsville, is having plans and estimates made for the construction of a modern sewer system.

The Magnolia Petroleum Company is having a survey made for its proposed oil pipe line that is to be laid between Cushing, Okla., and Alvord, Texas. It will be about 220 miles long and will cost, including the pumping plants that will be installed on the route, about \$2,000,000.

The Belton Ice Company will increase the capacity of its ice factory at Belton, to 35 tons daily.

William Seeger & Co. will install new machinery and double the capacity of their cotton gin at Floresville.

S. A. Robertson of San Benito, has been granted a franchise by the City Council for the installation of an electric light and waterworks plant at Mercedes. It is intended to also establish a large ice plant at Mercedes.

Preparations are being made for the installation at Fowler of an electric light and power plant and an ice factory. The construction of a waterworks system will also soon be started.

The Sinton Compress Company, Sinton, has been organized with a capital stock of \$35,000 for the purpose of installing a cotton compress. The incorporators are E. N. Phillips, R. R. Redus and Will Ficklin.

The Farmers Gin & Cotton Company will build a cotton gin at Lexington. William Fricke and others are interested.

The Garland Ice Mfg. Company is equipping a 20-ton ice plant at Garland. C. M. Brown is vice-president and general manager.

The San Antonio Machine & Supply Company, San Antonio, has filed notice of an increase in its capital stock from \$250,000 to \$300,000.

The City Commission of Fort Worth has ordered an election to be held on April 8 to vote on the proposition of issuing \$300,000 of water works reservoir bonds and \$175,000 of school building bonds.

Alberta. A large amount of new machinery will be installed there.

J. J. Crawford, C. E., president and managing director of the Edmonton Cement Products, Ltd., Edmonton, Alberta, announces that the capital stock of the company is about to be increased considerably, and that a number of electric motors are to be installed.

A report from Medicine Hat, Alberta, says that L. Carey, of Sauk Centre, Minn., representing the Radiator Mfg. Company of that place, has signed an agreement to build a manufacturing plant at Medicine Hat that will employ about 100 men. The cost of the plant is placed at \$100,000.

It is rumored that the Armour Packing Company, Chicago, will establish packing plants at one or two points in western Canada this year.

The Ecothermal Stove Company, Kingsville, Ont., has plans under consideration for the erection of a factory at that place.

The Anchor Mfg. Company, Ltd., Toronto, has plans in preparation for a new plant, including a machine shop which it will build at Preston, Ont.

The Chicago Bridge & Iron Works, Chicago, has purchased seven acres of land at Bridgeburg, Ont., opposite Buffalo, and has plans under way for the erection of a branch plant.

The Engineering Specialties Company, Toronto, has been incorporated by David Henderson, William H. McGuire and George Rooney of that city to manufacture castings and machinery for the production of heat, light and power and apparatus and fixtures for plumbing and steamheating.

The Shales Products Company, Caledon, Ont., is building and equipping a plant for the manufacture of brick, tile, etc.

The Picture Film Company, S. G. Sherry president, 158 Pearl street, Buffalo, has purchased site and completed plans for a plant to be erected at Bridgeburg, Ont., opposite Buffalo.

The Garlock Packing Company, Hamilton, Ont., has been incorporated with a capital stock of \$200,000, to manufacture and sell engine packings, pipe and boiler coverings and engine and mill supplies. J. M. Byrne, A. C. Pulver and A. R. Bell of Hamilton are the provisional directors.

The Turner Construction Company (Buffalo Branch) has received contract for the erection of a two story factory of concrete for the Mentholatum Company, Bridgeburg, Ont. The cost with equipment will be \$28,000.

The Heintz Art Metal Company, Buffalo, is arranging for the establishment of a Canadian branch plant at Bridgeburg, Ont.

## Government Purchases

WASHINGTON, D. C. March 17, 1913.

The Isthmian Canal Commission, Washington, will open bids April 5, under canal circular 766, which calls for reversing motor planer equipments, motors, structural steel, steel pipe and cast-iron pipe and a quantity of miscellaneous small tools.

The Quartermaster, Fort Bayard, N. M., will open bids April 4 for furnishing and delivering three transformers and one motor.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids March 11 for material and supplies for the navy yards, as follows:

Schedule 5198, class 1, one universal milling machine—Bidder 10, Brown & Sharpe Mfg. Company, Providence, R. I., \$1,532.92 and \$1,583.43; 99, Manning, Maxwell & Moore, New York, \$1,869, \$1,876.75 and \$1,919.88; 102, Niles-Bement-Pond Company, New York, \$1,747 and \$1,794.35; 157, Prentiss Tool & Supply Company, New York, \$1,571.84 and \$1,589.

Class 2, one tool makers' engine lathe—Bidder 99, Manning, Maxwell & Moore, New York, \$1,091; 110, Pratt & Whitney Company, Hartford, Conn., \$1,174.

Class 3, one portable electric-driven sensitive bench drive—Bidder 56, Hisey-Wolf Machine Company, Cincinnati, Ohio, \$74.97; 73, Kemp Machinery Company, Baltimore, Md., \$145.50; 137, U. S. Electrical Tool Company, Cincinnati, Ohio, \$85.50; 157, Prentiss Tool & Supply Company, New York, \$90.

Class 4, one motor-driven bench buffing lathe—Bidder 73, Kemp Machinery Company, Baltimore, Md., \$79.50; 137, U. S. Electrical Tool Company, Cincinnati, Ohio, \$63.

Class 5, one motor-driven two-wheel emery bench grinder—Bidder 29, Cincinnati Electrical Tool Company, Cincinnati, Ohio, \$52.50; 56, Hisey-Wolf Machine Company, Cincinnati, Ohio, \$60; 73, Kemp Machinery Company, Baltimore, Md., \$58 and \$89, alternate; 137, U. S. Electrical Tool Company, Cincinnati, Ohio, \$68; 157, Prentiss Tool & Supply Company, New York, \$72.

Class 6, one compound-leverage mandrel arbor press—Bidder 73, Kemp Machinery Company, Baltimore, Md., \$139.75 and \$125; 157, Prentiss Tool & Supply Company, New York, \$72.

Schedule 5204, class 51, two motors and two starting or controlling panels—Bidder 36, Diehl Mfg. Company, Elizabethport, N. J., \$920; 50, Fairbanks, Morse & Co., New York, \$623.30; 55, General Electric Company, Schenectady, N. Y., \$1,643; 58, Holtzer-Cabot Electric Company, Brookline, Mass., \$1,366.24; 122, Reliance Electric & Engineering Company, Cleveland, Ohio, \$1,296.

## Canada

WINNIPEG, MAN., March 15, 1913.

There is still considerable money stringency, but conditions in that respect seem to be clearing. The industrial outlook is brighter than it was a couple of weeks ago, and recent announcements indicate that there will be a great deal of activity in the manufacturing line in western Canada in the spring and summer. The local machinery houses are doing quite a large amount of business now, the situation having improved materially since the first of March. There is evidence that a large number of big business buildings will be erected this year, architects and contractors being very nearly as busy in that connection as they were a year ago.

It is reported that the Imperial Car Mfg. Company, Pittsburgh, Pa., has secured a site at Port Mann, B. C., and plans to erect a large plant there, with a capacity of ten steel freight cars per day.

It is announced that the Railway Accessories Company, Seattle, Wash., manufacturer of railway supplies, will build a branch factory at Moose Jaw, Sask., this spring. The company has a capital stock of \$100,000.

The Frampton Soap Company, Seattle, has decided to establish a factory at Moose Jaw.

The Shope Machinery & Products Company will install a brick-making plant at Moose Jaw this summer.

Knowlton Bros. are preparing to establish a brick-making plant at Lethbridge, Alberta.

The Brandon Construction Company, Brandon, will increase its capital stock to \$60,000. It will in future manufacture all kinds of doors, sashes and moulding on a comparatively large scale.

It is announced that the Canadian Northern Railway will enlarge considerably the work shops at Vermillion,



## Trade Publications

**Belt Lacing Machines.**—Clipper Belt Lacer Company, 1006 Front avenue, N. W., Grand Rapids, Mich. Pamphlet. Illustrations and descriptive matter explain the operation of the Clipper belt lacing machines which are built in three sizes. These machines range in capacity from 4 to 6 in. of belt width and can be used for lacing any width or thickness of belt. An illustrated description of this machine appeared in *The Iron Age*, November 21, 1912.

**Ventilating Fans.**—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Mailing card. Calls attention to the use of a propeller fan for keeping the air in offices and factories cool and pure. These fans which are arranged for either pulley or electric drive will keep rooms free from smoke, odors, steam and gases and cool the atmosphere without creating perceptible drafts.

**Clutch Pulleys and Cut-off Couplings.**—Eastern Machinery Company, Ashmun and Gregory streets, New Haven, Conn. Catalogue No. 6. Supersedes all previous issues and relates to an extensive line of friction and clutch pulleys and friction cut-off couplings. After discussing the advantages of friction clutches a description of the Fresbie friction clutch pulley is given with a list of the various sizes in which it can be furnished. A number of different types of hoisting machines operated by friction clutches are illustrated and briefly described and a comprehensive telegraph code completes the catalogue.

**Grinding and Polishing Machinery and Supplies.**—L. Best Company, 45 Vesey street, New York City. Catalogue No. 12. Treats of various types of grinding and polishing machinery and supplies, which include brushes, buffs, countershafts, wheel dressers, emery bricks, knife and tool grinding machines, polishing machinery and polishing wheels and belts. All of the machines are illustrated and briefly described with condensed specification tables and in the case of the emery wheels, views are given showing the various shapes which can be supplied. Directions for ordering and using emery wheels and a grading list are included.

**Second-hand Machinery.**—Harold R. Wilson Company, 1101 New Bank of Commerce Building, St. Louis, Mo. List No. 10. Gives a list of electric generators and motors, steam and gas engines, air compressors, contractors' equipment and boiler room accessories carried by this company.

**Rivetless Chain.**—Cross Engineering Company, Carbondale, Pa. Circular No. 1. Relates to the Simplex rivetless chain which is designed for heavy duty and is interchangeable in all parts. The chains are of the detachable type, and the links and pins can be easily and quickly assembled or detached without the use of tools. The design of the chain is illustrated and described and there are views showing the arrangement of the links for side and center drives. Attachments for car, log and ice hauls; box and barrel elevators and all other standard means of elevating and conveying by center or straight line drive, single and double outside drive and side drive, can be furnished. Instructions for assembling the chain and reversing the pins are also included.

**Internal Combustion Engine.**—Busch-Sulzer Bros.-Diesel Engine Company, St. Louis, Mo. Pamphlet. Gives a brief historical account of the invention and development of the Diesel engine, followed by the results of a test made on a 225-hp. unit to show its economy and thermal efficiency. A summary of the tests which were six in number is given, and this is supplemented by several curves. Exterior and sectional elevations of the engine are given together with a table of dimensions, weights and ratings.

**Pipe Union.**—National Tube Company, Frick Building, Pittsburgh, Pa. Folder. Points out the advantages of the Kewanee Union, and describes the tests to which each individual union is subjected before it is shipped.

**Sheave Wheels.**—Edgar Allen American Manganese Steel Company, McCormick Building, Chicago, Ill. Bulletin No. 57. Concerned with the use of Stag brand manganese steel for sheave wheels which are claimed to be practically unbreakable and will not cut or injure the cable used on them. These sheaves are recommended for heavy service or for use in grit laden air. The various styles of sheaves made for use with cranes, conveyors grab buckets and steam shovels are given together with drawings of the various rim sections and tables of dimensions.

**Lamp Guards.**—McGill Mfg. Company, Valparaiso, Ind. Folder. Refers to the use of lamp guards which can be furnished to protect incandescent lamps against breakage and theft. These guards are made in several styles, one of which is fastened on by a key. Illustrations and brief descriptions of the guards are given.

**Metal Working Machinery.**—Warner & Swasey Company, Cleveland, Ohio. Catalogue No. 15. Size, 6 x 9 in.; pages, 168. This catalogue which supersedes all previous editions contains illustrations and condensed specifications of a line of metal working machinery which includes turret lathes of the hollow hexagon, set-over, forming and universal types, turret screw machines and miscellaneous brass working machine tools. In the catalogue a brief description of each of the several classes of machines is given followed by illustrations with specifications on the facing pages of the various tools going to make up the line. Illustrations of samples of the work turned out on these machines are given and a number of tools and accessories which can be furnished are also illustrated and briefly described with instructions, for ordering them. A general index and telegraph code are included.

**Boltless Flask and Flask Bar.**—John Tuohy, Pittsburgh, Cal. Circular. Calls attention to a boltless, interchangeable flask and flask bar which can be combined so as to make up and bar any size of flask from 24 in. square upward by increasing the width or length in 6-in. steps. This is accomplished by employing flask sides and ends of varying lengths having sockets, the whole system being held rigidly together by simple wedges. A brief description of the system is given together with drawings of the various bars and views showing the flask in use.

**Sensitive Radial Drilling Machine.**—American Tool Works Company, Cincinnati, Ohio. Circular No. 312. Concerned with the American high speed sensitive radial drilling machine which is built with stationary and elevating tables and also with a pedestal base, the table being omitted. This machine was designed and built for the purpose of providing one that was especially adapted to drilling and tapping small diameter holes at high speeds and in the design an effort has been made to combine the efficiency of the plain sensitive drilling machine with the large productive capacity of the radial type. The various features, such as convenience in operation, a centralized control and the use of a ratchet lever feed and a very simple design of head, are briefly touched upon. The different types of machine are illustrated and a condensed table of specifications is included. An illustrated description of this machine appeared in *The Iron Age*, November 28, 1912.

**Protection for Concrete Work.**—Trussed Concrete Steel Company, Detroit, Mich. Two circulars. Deal with two new Trus-Con products, which are a curved bar that can be used for protecting the edges of curbs and exposed corners of columns in factories, freight stations, warehouses, etc. These bars consist of a curved piece of steel with an anchor bolt and are put in place when the column or curb is being built. The other product is an armor plate for protecting the expansion or contraction joints in concrete roads or pavements. In both of the circulars illustrations are given of the devices and their uses are also shown.

**Exhaust Head.**—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Mailing card. Shows the Sturtevant exhaust head, which operates by centrifugal force and separates moisture from the exhaust steam. The water of condensation is conducted away and the dry steam is discharged into the atmosphere, thus keeping roofs and surroundings free from moisture.

**Crucibles.**—Ross-Tacony Crucible Company, Tacony, Philadelphia, Pa. Pamphlet. Pertains to a line of crucibles for brass and steel, as well as special designs for use in furnaces of the tilting type and for bottom pouring. Mention is also made of phosphorizers, retorts, stirrers, skimmers, stoppers, nozzles and sleeves. All of these are illustrated and instructions on the use and handling of crucibles are included.

**Superheaters.**—Heine Safety Boiler Company, 2449 East Marcus avenue, St. Louis, Mo. Pamphlet. The first portion is a reprint of a paper from the Journal of the Engineers' Society of Pennsylvania, discussing the steam and fuel economy of superheating, the various designs of superheaters and the methods used for obtaining control of the temperature of the superheater. The latter part of the pamphlet is devoted to extracts from the Transactions of the American Society of Mechanical Engineers on the effect of superheated steam on cast iron, with examples of the effect of fluctuating steam temperatures and excessive temperatures. A brief description of the design and operation of the Heine superheater, which was illustrated in *The Iron Age*, June 12, 1912, is also included.

**Engine Lathe.**—Cincinnati Iron & Steel Company, Cincinnati, Ohio. Circular. Describes the Cisco 16-in. engine lathe. Among the special features of the lathe are the covering of all gears, a heavy and compact construction, interchangeable parts and the use of only two wrenches to make all the necessary adjustments. Views of the lathe with the various parts and features marked are given, together with a condensed table of specifications.

**Cranes and Hoists.**—Reading Crane & Hoist Works, Reading, Pa. Pamphlet No. 101. Illustrates a number of different types of handpower traveling cranes, overhead tramways and trolleys and chain hoists. The purpose of this pamphlet is merely to give some idea of the various types built, all of which are described at length in separate bulletins.

**Metal Paints.**—Moller & Schumann Company, Marcy and Flushing avenues, Brooklyn, N. Y. Booklet entitled "Finishing Metal Products." Presents a brief outline of the finishing of steel furniture and trim, machinery, castings, forgings, stampings, etc. After a discussion of the various colors, the methods of finishing and the materials used, general directions are given on the use of the different finishes made by this company. A table of safe baking heats of pigment colors is given and an extensive alphabetical list of products finished with the metal paints of this company is appended, the several finishes being given in connection with each product.

**Electrolytic Generation of Oxygen.**—International Oxygen Company, 115 Broadway, New York City. Pamphlet No. 9 and bulletin No. 10. The former brings out the features of safety, economy and efficiency of the electrolytic system of generating oxygen and hydrogen for all industrial purposes. Views of the generator and comparative cost data are included. Bulletin No. 10 contains an illustrated detailed description of the company's latest generator, which is known as the type No. 200.

